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ABSTRACT

Remarks presented at the Southeastern Regional Conference on the Social Sciences and Environmental Education, held at Athens, Georgia, are compiled in this document. Two major conference addresses are reported in their entirety: "International Programs in Environmental Education" by Dr. Jan Cerovsky, Education Executive Officer, International Union for Conservation of Nature and Natural Resources, Morges, Switzerland, and "National Legislation and Environmental Quality" by Congressman Ben Blackburn of Georgia. Comments made by panelists or participants at four sessions are covered under the following topics and headings: (1) "Key Ideas from the Disciplines" - Ecology, Economics, Geography, Political Science,and Sociology; (2) "Implementing Curriculum Changes" - National Park Service Educational Programs, Land Between the Lakes, Tennessee Valley Authority, Curriculum and Supervision, Science Education, Brentree Environmental Center, and Citizen-Consumer Response; (3) "Curriculum Applications" - Notes from Group Meetings (College, Secondary, Middle and Junior High, Elementary), Student Reactions, Closed Circuit TV, Simulation Games, Materials, and Selected Films; and (4) "State Action Reports" - Alabama, Florida, Georgia, Kentucky, North Carolina, and South Carolina. A candid evaluation of the conference - its organization, content, value, and participant reaction - is supplied. The report concludes with a list of participants, exhibitors, and a bibliography. (BL)

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THE SOUTHEASTERN REGIONAL CONFERENCE

ON

THE SOCIAL SCIENCES AND ENVIRONMENTAL EDUCATION

Department of Social Science Education
Aderhold Hall
University of Georgia
Athens, Georgia 30601

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The Southeastern Regional Conference

on

THE SOCIAL SCIENCES AND ENVIRONMENTAL EDUCATION

Robert N. Saveland

Conference Chairman

1971

Department of Social Science Education
Aderhold Hall
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INTERNATIONAL PROGRAMS IN ENVIRONMENTAL EDUCATION

Dr. Jan Cerovsky, Education Executive Officer, International Union for Conservation of Nature & Natural Resources
Morges, Switzerland

In the field of environmental conservation, the necessity for international cooperation and action is certainly much more urgent than it appears in many other disciplines of science and fields of human activities. There is a great need for exchange of experience as to how problems are dealt with in various countries and parts of the world. Mankind has only one biosphere which, in spite of all its varieties, after all is one big unit with all its complicated and subtle interrelations between man, other living creatures and their physical surroundings. This biosphere is and will ever be the natural biological basis of mankind. The recent space adventures of man have not denied, but rather have stressed, man's primary dependence and his vital interest in this "Green Spaceship Earth."

The very existence of natural resources, their natural interchange, and their use by man make nature conservation an international matter, because they extend beyond the boundaries created by people through the political division of the world. Birds, fish, and animals move in this world from one country to another without passports and visas. All the very careful protection of small birds in most of the European countries would not be of any use, if the Italian Government insisted on its right to allow those birds to be slaughtered by thousands and millions on their old natural migration through Italy. By the way, international opinion has quite recently compelled the Italian Government to cancel the permission granted again in 1970 for hunting those birds. An international convention on preservation of wetlands of the Old World, actually initiated by the IUCN, will virtually assure the conservation of important habitats of migratory wildfowl. A successful conference in Iran last winter brought in an encouraging interest and basic unity between the relevant specialists and officials from both West and East. The marine environment, no doubt, is distinctly one of international character; as demonstrated by the contemporary efforts of IUCN in the field of conservation and rational use of marine turtles and whales. It has been brought to attention, some two years ago, that the U.S.A. is getting more than one half of its total consumption of oxygen from the Pacific Ocean area, due to the life activities of marine plankton. But marine environment is endangered and we still have very much in mind the Torrey-Canyon case which happened at the British coast.

Rivers bring not only life-supporting water, but also killing pollution across frontiers, My native country, Czechoslovakia, lies, as we used to say, "on the roof of Europe." No big river enters Czechoslovakia from any side, but many rivers, including the Elbe for example, originate in my country and leave it in many cases in a terribly polluted stage, I am sorry to say. Turbulance is also bringing polluted air from hundred miles away. The fisheries on Swedish lakes are being ruined contemporarily because of pollution which, according to Swedish investigations, is being brought by air from highly industrialized regions in North-West Europe. Lake Baykal in remoted Siberia represents the whole ten percent of the world's naturally drinkable water

supplies available at this moment. Then is not its conservation against the recently constructed industry on its shores and the resulting pollution finally also an issue of international interest and importance? Thus, conservation in its substance is a pretty international matter.

Nature conservation started, a century and half ago, as a partly romantic, partly scientific effort to preserve outstanding landscape features and vanishing species and samples of plants and animals (nature monuments). Rather rapidly, conservation developed into ecologically-based studies and efforts aiming at protection and rational use of natural resources and of natural components of the living space of man. The importance of its objectives for the sake of human survival became evident, although it does not and must not forget all other living things on Earth.

Only a few years ago environmental conservation was "a voice in the wilderness," when only a relatively small group of people were aware of the existing and future problems and were trying to attract the necessary attention of the broad public and of the responsible "decision-makers." This was a stage which I myself call period number one in the development of nature conservation. We are now contemporaries of period number two. I call it the "period of talking." The general public, including the politicians and other decision-makers, is making a turn to environmental issues. Period number three, which has to follow as soon as possible, must be the period of action. Action in this sense does not mean going once a year in a near-by forest and cleaning out empty beer cans and other litter. Action means correct behavior of every citizen in protecting, managing and designing his or her total environment.

Everybody has his share of responsibility concerning the quality of environment. For some this would mean only his home, garden or backyard, his impact on the outside natural world during weekends and holidays, his own litter and garbage, and pressure on representatives in government at various levels to bring about local or national improvements. For those, whose professional activities are concerned with an important impact on the environment, such as mining, industry, agriculture, forestry, etc., the share of responsibility is no doubt considerably greater. This includes, of course, those who are making decisions. Much is being talked about the total inability of existing systems and structures to resolve existing and future environmental problems. But those systems and structures are created by people who very often act without any awareness or even knowledge concerning the environment, its basic natural component in the first place.

What is basically needed, is a radical change in people's attitudes. Constructive attitudes toward the environment, both in philosophical and pragmatical senses, must become an ingredient in everybody's thinking and acting. Recent years have shown an encouraging increase of spontaneous interest in constructive solutions to environmental problems of interest in direct personal involvement among rather broad groups of people including the general public. The "European Conservation Year 1970" sponsored by the Council of Europe was a large international project which had a considerable impact on public opinion in a large part of Europe. Also in the East European socialist countries, there have developed, during the last years, notable publicity campaigns, sponsored

partly by relevant authorities, partly by influential voluntary organizations, such as the All Russian Society for Conservation of Nature, which, with its more than 15 million members represent the world's biggest national voluntary environmental conservation movement. The last year's "Teach-In" in the U.S.A., both reflecting and developing in its beginnings emotional interest of young people, is certainly familiar to you. Also, in developing countries the interest of local people in their environment begins to emerge and to grow: the Wildlife Clubs of Kenya (presently some 100 groups scattered all over the country) already actively involve more than 5000 students of secondary and high schools.

But still, very little has actually been done for broad and adequate implementation of environmental education which we believe to be one of the basic keys to solution of environmental problems. Environmental education, according to the definition endorsed by the 1970 International Working Meeting on "Environmental Education in the School Curriculum" (held at Carson City, Nevada, as a part of UNESCO's International Education Year under the sponsorship of the Foresta Institute for Ocean and Mountain Studies, UNESCO AND IUCN), "is the process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the interrelatedness among man, his culture and his biophysical surroundings. Environmental education also entails practice in decision-making and self-formulation of a code of behavior about issues concerning environmental quality."

Such an education, to be effective and to reach everybody, must be carried out through a comprehensive, integrated, as well as continuous and sustained program, thus being an important and substantial part of life- (permanent) education of every citizen.

The "Biosphere Conference," convened by UNESCO in 1968 in Paris, which as the first representative intergovernmental meeting drew the attention to environmental problems on a world-wide scale, discussed in considerable depth the issue of environmental education and endorsed recommendations for relevant programs, both national and international.

Some long years ago, the International Union for Conservation of Nature and Natural Resources (IUCN), founded in 1948, established its special permanent Commission on Education, as it felt the need for and the importance of this part of general education. The Commision encourages in the various countries of the world, and in international organizations, the promotion and stimulation of the every-growing importance of careful and constructive attitudes of man toward his environment, especially to its natural resources, taking into consideration the many-sided needs of societies for these resources. This means, in other words, the launching of continuous and sustained programs of environmental education. The programs must be developed on various main levels:

1) Appropriate education at pre-school level;
2) Teaching environmental conservation in schools of all levels and types;
3) Adequate training of teachers and other educators, both pre-service and in-service;

4) Teaching and training specialists in environmental conservation and management as well as other professionals in high schools and at the university level (including post-graduate and in-service teaching and training);

5) Out-of-school education of children, youth and adults, preferably as education through activities;

6) Dissemination of environmental conservation ideas and principles to the broad public, using mass-media particularly, and also some special forms (such as nature trails, sport centers, etc.).

Recently, the Commission is orienting its activities toward the preparation, launching and execution of concrete projects. These are aiming particularly at the four main areas of activities:

1) Preparation of curricula, textbooks and teaching aids;

2) Organization of conferences, working meetings, seminars and courses on a broad international or regional level;

3) Publication of special works, methods and reference manuals and information bulletins;

4) Consultation of authorities, organizations, and schools and universities and missions of specialists to various countries of the world at their request.

Since conservationists started the environmental conservation movement, environmental education began as nature-protection education. Conservationists recognized the need for as many people as possible to be educated to understand and appreciate relations with nature, which later was applied to the whole environment. Environmental education thus has to become an important objective of many different disciplines, in all of which their impact on environment has to be studied and taught. Science, particularly biology teaching lost its monopoly in environmental conservation education. However, it still remains and will always remain the key discipline, as man is a living thing and the natural component of the environment will always be the natural, biological basis of his existence.

Environmental education, for the very reason that it is environmental, must be carefully adapted to regional, national, or even local patterns because of different traditional, cultural and socio-economic backgrounds. But even then, globally valid principles and practices can be set up. Together with the evident interrelations within the biosphere, multiplied by large-scale regional, continental, or even inter-continental environmental impacts on contemporary civilization, this does stress the need for international programs in environmental education. The above mentioned international working meeting on "Environmental Education in the School Curriculum" proved this with absolute evidence: top specialists in both conservation and education from 14 countries of 4 continents easily found a common interest and identified the

general problems and perspectives. Their pioneering work will be further developed through a series of regional follow-up meetings and seminars. Taking the liberty of expressing mine and my organization's pleasure that your conference may be to a certain extent regarded as one, as for the timing the first of them, I sincerely wish a good start to all programs, which this meeting no doubt will encourage in your schools. We will be happy to learn from your results and experience and implement them in the development and improvement of our intern.. ional programs.

The Commission on Science Education defines education in relative terms: one person being more educated than another on grounds that he knows to a fuller extent whay may be the consequence of events. Any given individual is likely to have some areas of particular individual competence. Even the best educated individual is likely to have notable weaknesses.

Robert R. Livingston, M.D.

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NATIONAL LEGISLATION AND ENVIRONMENTAL QUALITY

--Congressman Ben Blackburn

In any discussion of legislation, it is necessary to examine the means and methods by which legislation comes into being--in this case, the Politics of Pollution.

When we use the term "politics" we must recognize that it has different meanings for different people. For a person running for public office or occupying an elective public office, the term evokes thoughts of partisan political activities designed to win support for coming elections. For the partisan political worker, the term "politics" means locating friendly voters and insuring their vote on election day.

For the scholar who is specializing in the field of politics, the term would include a study of the political structure of government, a much more scientific area, subject to dispassionate analysis and discussion. In short, for the political scientist, the study of politics becomes an analysis of the relationships of state, local, and national governments to each other as well as the relationship of government to its citizens.

If we are to be complete in our discussion, we must direct our attention to politics in both the sense of partisan politics as well as the more formal study of the relationships of various governmental bodies and the functions of those governmental bodies.

Let me first comment on politics on the partisan or elective sense. Is it good politics to take up the cudgel for strong pollution controls? An elected public official recently stated that pollution control would not be a long-lasting political issue. His reasoning was that any political issue, to remain under public discussion, needs both a proponent and an opponent. No one can stand up after his political opponent has urged the control of pollution, and argue in favor of greater pollution. In the absence of such a possibility in debate, the issue will soon die.

At the other extreme, another political official commented that "These kids running around hollering about pollution don't know what they are talking about. During the depression when people looked down the street and saw smoke coming from the factory smokestack, everybody in town was happy because it meant that men were working and there would be a payday on Saturday."

Neither of these two extreme positions, one arguing that pollution is not a political issue and the other being that pollution from factories is a good thing, are reflective of the interests of the general public. The best course a politician can take is to recognize that there is a public demand that our environment be improved by preventing further abuses of our natural habitat and moving to improve present technologies so as to improve existing pollution-causing devices to prevent noxious discharges.

Politics is the art of what is possible. Not what may be theoretically desirable. Thus, politics will be effected by economic considerations and the emotional, and rational reactions of the people that politicians seek to serve. Those of us charged with the responsibility of government are constantly adjusting and compromising the funds which will be available for desirable projects under the pressures of a limited budget.

With this in mind, we must devote additional research to the prevention of pollution of our nation's waterways from needed production facilities. We need the benefits of our productive capacity and we will find that there will be a cost to you and me as citizens and consumers as we move to improving our environment. The cost will be in the form of higher prices for the goods and services that we receive. Our automobiles will not be as powerful, our gasoline will cost us more, and we will probably not get as many miles per gallon. We may find that the growth of our standard of living may not accelerate at the same rate that we have enjoyed for the past 10 or 15 years while we readjust our technology to meeting the demands of environmental standards. It remains to be seen how popular some of these adjustments will prove to be when their impact begins to be felt.

As the impact begings to be felt, the realities of politics will assert themselves and it will require strong determination on the part of our political leaders as well as adequate educational effort on the part of those involved in environmental problems to condition the American public to the necessities for such higher costs and concomitant lowering of the standard of living. We can only hope that improved technology will avoid any substantial lowering of the standard of living which we all accept with comfort.

A further problem deals with whether or not existing political structures, at the state and local level as well as at the national level, are adequate to meet today's challenges. In my opinion our structures of government are not adequate. We find, in many instances, petty conflicts between agencies which involve jurisdictional disputes which do little to further the circumstances of pollution control.

A study last year which was reported in the EVENING STAR, a Washington newspaper, found that there are at least 94 agencies, commissions, committees, and advisory boards at the executive and congressional level concerned with the nation's environment. In the federal establishment alone there are at least 10 coordinating agencies. The study, conducted by Mrs. Elizabeth Haskell of the Urban Institute, further found that "There was a 'piece-by-piece' attack on environmental problems without a clear idea of the entire picture." Conflicting efforts and a "tug of war" between program officials have contributed to a lack of priorities on the more pressing aspects of the pollution problem.

In the WALL STREET JOURNAL, John G. Welles, Head of the Industrial Economics Division of the University of Denver Research Institute, wrote of the effect of population growth on pollution--air, water, land, noise,

visual, and thermal. "Let us consider technology under a stable population. The amount of technology used in a society generally is a key factor in determining the standard of living or gross national product of that nation. Unfortunately, however, the amount of pollution occurring in a nation has generally been a function of the amount of technology used. The richer the nation, the greater the pollution. Hopefully, anti-pollution efforts will be successful in allowing a nation to be rich without excessive pollution. However, sooner or later it seems that something has to give--either we stop population growth or we reduce our standard of living. Poor people pollute less, so the world could support more of them from an ecological standpoint."

Prior to May 29, 1969, when the Environmental Protection Act of 1969 was signed into law, there was no central department in the federal government having the responsibility of taking an overall view of environmental quality. We had the Corps of Engineers, the Department of Interior, the Department of Defense, the Department of Agriculture, the Water Resources Council, and the Department of Health, Education and Welfare.

A recent publication issued by the Citizens Advisory Committee on Environmental Quality chaired by Laurence S. Rockefeller made a thorough study of the problem of disposal of liquid waste. This committee concluded that in the field of liquid waste disposal, the responsibility is too fragmented among various municipal and county governments, even when they use the same drainage basin. As a result of such fragmentation, too many small plants are produced at too high a price and the similar plants are often not as efficient as one larger plant would be.

This Committee recommends that each state establish a public corporation to deal with the financing and planning of area-wide liquid waste facilities. Such a corporation would be financed by a revolving fund of bonds guaranteed by the state as well as federal funds. Such state authority would eliminate the need for federal agencies to deal with thousands of municipalities. The state authorities could better plan to meet the needs of its own drainage basins, its own disposal plants, etc. Thus there would be greater administrative efficiency in that the federal government would be dealing with 50 state agencies instead of thousands of small groups. The state authority would in effect "sell" its disposal services to the local governments which would contract with the authority for the service.

The purpose here is not to indict our present political structure, however, it is inadequate and inefficient for the task of pollution control. We inherited our present structure and must retain its advantages while moving to eliminate its disadvantages. Regional authorities could be established for dealing with air pollution control as well as water purification and distribution. State governments should be encouraged to execute compacts with adjoining states where they share the same drainage or river basin for the common purpose of cleaning up the waters of such basins.

In essence, the government can do no more than the citizens permit. The art of politics in a democracy is the art of doing the possible, and the conflicts between good politics and good economics will sometimes result in a compromise which is neither totally good nor totally bad. Perhaps, in the final analysis, it will be the human instinct for survival which will bring about an effective relationship between politics and pollution control.

KEY IDEAS FROM THE DISCIPLINES

Introduction

Marion Rice, Chairman

This panel reflects the divergent views of an ecologist and four spokesman from the social sciences--economics, geography, political science, and sociology.

Dr. Odum sets the stage by emphasizing that ecology is a total science concerned with man's environmental house. The social scientists, on the other hand, view ecology from the perspective of their distinctive disciplines. Dr. Green, speaking for economics, emphasizes the aspect of economic management and cost allocations. Dr. Stone, from the standpoint of geography, emphasizes the fact that there are different environments, and that one must first specify the type of environment under consideration.

Decision-making is the key idea from political science, as presented by Dr. Marando. Dr. Kelly, speaking from the standpoint of sociology, indicates that the attitude of man toward his environment is more important than technology.

In the short time allotted to this panel, it was not possible to develop a synthesis. However, the reader will quickly perceive that there are many approaches to the environment, according to the assumptions with which one views the interaction of man, culture, and the environment. Each discipline, from its particular viewpoint, can make a contribution to environmental understanding. The environmental educator needs to consider these viewpoints, as well as those of the biological and physical scientist, in arriving at an ecological synthesis.

KEY IDEAS FROM THE DISCIPLINES

ECOLOGY

EUGENE ODUM

Ecology is unique in that the word has recently been redefined by the public. What it now means is rather close to the roots of the word:

Ecos - the Greek word for house, and

logy - meaning "study of."

People have also been using the term as a noun as in, "Don't hurt the ecology." What they mean is, "Don't hurt our environmental house."

Up to now, man has mainly considered himself--his own problems, survival, etc. Before now he has not had to think of the totality of man's environment as necessary for survival. A new applied science which we can call applied human ecology is thus emerging (no longer a theoretical system). The point is that the whole world is a system and we suddenly have to practice things we've previously known only in theory. How do we teach this?

Point two is that ecology is a bridge between the natural sciences and the social sciences. We cannot compartmentalize any longer. In Hawaii recently I observed a junior high school where they were teaching physics along with ecology--two subjects not normally taught together. The students studied the laws of gases and the composition of sulfur dioxide along with the effects of air pollution on plants. The greatest role ecology can have is bringing together C. P. Snow's two worlds--the physical scientists and the social scientists. In truth, nobody has been looking at totality. The greatest challenge is how we can teach the next generation to look at the whole, then at the parts.

A final point that I would like you to think about and talk about. Start with the idea of a house. Make an analogy between our real house (environmental house) and our artificial house (ones we construct). Think of a house that has rooms for different functions and has plumbing and wiring systems. The kitchen is the food compartment. You can start with how many acres does it take for breakfast? Students can learn that man needs 1 1/2 acres with a meat diet, but less with a rice diet. Also look at the bathroom. Take students down and show them the sewage plant for the town. They can learn about bacteria and pollution first hand. From the living room they can learn that man needs a quiet place and books. Investigate room needed for recreation. What land should be set aside for a golf course, or hunting or fishing? The point is--let's teach kids the truth about the whole, about the fact that man requires a large environment--more than just enough to feed and clothe him. In trying to solve a minor problem (i.e., mosquito bites) we may create a major one (an unbalanced ecosystem) because we can have some awful backlashes. Ecology is our total house.

ECONOMICS

JAMES GREEN

As indicated by Eugene Odum, the stem Eco plus logy spells Ecology and encompasses the concept of "House" (in the sense of an environmental "space-ship" earth. Eco plus nomics spells Economics and encompasses "management" of the House.

From the beginning of the United States to 1929 is about 150 years. During this dynamic growth period, Americans crossed the continent and settled the land, linked the oceans with railroads, developed cheap steel, the auto-mobile, the production line, telephones, electric power, and the "Great White Way." In 1929, for the first time, this nation managed its economy so as to produce an income of one hundred billion dollars. (GNP, $103.7 billion)

From 1940 through 1970, the economy was managed more effectively; more than $500 billion (in dollars of standard puchasing power) was added to the nation's income. In this short 30 year span, our economic system produced five times the real income that the nation's first 150 years produced. This reflects the turn to a positive economics. The very success of economic management contributed to the side effects now billed as ecological disaster. (We economists are in the position of the surgeon who performed the brilliant and successful operation, but the patient died.)

The two contrasting periods dramatize key economic variables. In particular, key variables are: (1) population growth and composition, (2) labor force participation rates, (3) investments in human knowledges and skills, (4) availa-bility of natural resources, (5) technology and its use, (6) the economic institutional structure as it functions to allocate and utilize resources, and (7) that system of rules and institutions that governs the distribution of income generated through the economic production process.

Man's economic evolution illustrates a continuing drama. . . .A race between the rate of population growth and the rate of productivity improvement. The student of economics should be cognizant of the impact of technology on the environment, work and life styles, and the economic-social heirarchial relationships established.

Any economy is characterized primarily by those forces which motivate men in economic endeavor. In the market economy consumer sovereignty directs the allocation of resources and their utilization through the price mechanism. Enterprise managers organize resources, employ labor skills and knowledge, provide the capital and the direction, and create and distribute income through the employment process. Governments' economic role as a purchaser of goods and services and as a regulator of activity promotes stability, growth, and environmental balance. Managers in the enterprising system are under continuing pressures to minimize internal costs and transfer as much external cost as possible to the public. The results are the well known diverse pollution patterns. However, if government will act to establish acceptable standards governing production and consumption processes, the enterprising market system will operate within the framework established to produce what the public demands without harming the environment. What is needed is forthright political decision that leaves all producers and consumers in the same relative position.

GEOGRAPHY KIRK STONE

The discipline of geography has long been defined as a distributional analysis of man-land relations. The "geo" part means we are world-wide in scope and the man-land relations requires a direct concern with the spatial relations of environment. With topics so large in area and concept, a focus is needed. So this part of the panel is addressed to the question: how can locational analysis be used in the K-12 curriculum so as to make environment more comprehensible than it appears to be?

In initial summary it seems that a geographical approach can contribute by asking at least four questions. These might be:

1) what is the geographical environment?
2) what kinds of geographical environments are there?
3) how do these environments change?
4) how does one measure the significance of environment to people?

Note that the approach is one based on interrogation--not exposition--to allow the student's appreciation that there is so much to learn and that he or she can contribute (and grow the most) by seeking out an element that piques their curiosity the most and following it. Now a word about each question.

1) What is the geographical environment? This is the totality of spatial relationships of physical elements to each other, of physical elements to cultural features, and of cultural elements to cultural elements. We discover what this is by asking the questions of where is something and why is it there? One useful progressive set of questions related to this is for a student to be asked? 1) why he is in a particular seat in that room, 2) why in that particular room, 3) that school, 4) that part of the city, 5) that city, 6) why that part of the state, 7) that state, and 8) that part of the United States. The totalilty of the answers not only discloses the complexity of decision-making about location but also the various physical and cultural elements in an environment.

2) What kinds of geographical environments are there? The answer is a nearly unending number. Certainly it is more than a part of the physical landscape. The delineation partly depends on viewpoint; the morning's paper referred to certain military leave being available only to those who have been in a "combat" environment. With this example a student can be led easily to see the various kinds of environments based on topics: the high-population-density environment, the low-population-density environment the urban and the rural, the automobile and the animal, the dry and the wet, the hot and the cold. And all of these should be penetrated far enough to disclose that dichotomous classifcations are often unreal and one needs many other categories. One dictionary's general categories are: physical, biological, social, physicosocial, biosocial, and psychosocial.

Recognition of kinds of environment also depends on the scale of consideration. An elementary student may be led by a field mapping exercise in a city block to recognize the immediate environment. At another grade a more extensive exercise by car or bus and with simple maps can demonstrate the local environment's nature. Still later, perhaps with the use of an airplane (and it has been done), the scale of thinking can be decreased to the regional level. With satellite photography and wall maps it should not be difficult to reach the smaller scales. By this the student sees that different elements are significant at difference scales just as we know that coffee is produced some place in the Caribbean that is accessible generally to the U. S. market, in an area of stable government, near the eastern coast, at an elevation of about 2500 feet, under the shade of taller plants, and on certain soils. We must describe and analyze by multiple-scale considerations.

3) How do environments change? Some naturally and some unnaturally. Some slowly and some rapidly. But they have changed and are changing locationally. Now we have the separate continents of Africa, South America, and Australia in place of the Gondwanaland they once formed; their drifiting apart is related to the present distributions of certain plants and animals. Southeast China was once a mixed deciduous and coniferous forest and now it is cleared and cropped. Polar climates were more extensive in the 1300s than they are now. Indians once roamed much of Georgia but now most of their descendents are concentrated in a state far to the west.

Inasmuch as various elements of the environment have varying degrees of interdependence on other elements a change in one may cause several other variations. This variable dependency or direct relationship is as applicable in the human environment as in the physical; for example, improved medical ability in Latin America has lowered its death rate to 9 per 1000, leaving its birth rate at a high 38 so the growth rate is 2.9% per year, but its per capita gross national product per person is only $300 - $500 in most countries.

4) The fourth question is how to measure the significance of environment to people? Let us say, first, objectively and by direct observation--not by interpretation. To determine, for example, what parts of an environment are attractive to people, let us train students to seek answers from those people and not to just "figure out" why they are there.

An example of what not to do is drawn from the Northern Lands. One can find many references stating that people live on the south-facing slopes because they are so far north and want the sun. This is pure nonsense! It is derived from mid-latitude interpretations. And poorly founded ones at that for most people do not live on such slopes in the first place. In the high latitudes, though, you get sun on <u>all</u> slopes in the summer because the sun does not set and on south-facing slopes you

GEOGRAPHY KIRK STONE

may get the most soil-creep because of increased freezing and thawing. Most important, in more than 25 years of asking people in the north countries why they settled at a particular place, I have gotten only one answer that was "for the sunlight."

Similarly let us remember that a desirable element in one culture may be undesirable in another. What is, therefore, considered a pollutant in one part of the world may not be elsewhere. A Georgian in Mexico may be sick from drinking water that has no such effect on Mexicans. Some people, I hear, eat dirt--like pregnant women in Africa.

In summary, may we train people to think for themselves: 1) by the technique of questioning, 2) by the knowledge of variations in the distribution of things related to the environment, 3) by the recognition that an environment is a complex relationship at a given moment, and 4) by objective measures of the significance of the environment to a specific people at a specific time and in a specific area according to multiple-scale considerations.

POLITICAL SCIENCE VINCENT MARANDO

Social Science is concerned with public decision making and policy output that is responsive to public needs. Currently environmental issues are a dime a dozen, particularly with politicians. We see bills that could not be passed several years ago being passed now. We see organizations such as the Sierra Club growing from 15,000 to 85,000 members in ten years with other split-offs forming. Other groups are taking a more militant stance.

Ecology is of general concern. But government doesn't respond to general concerns. Goverment responds to specific concerns and specific problems. Political Scientists really do not know what environmental issues are. For example, we are not certain how aware most of the populace is regarding environmental matters. How concerned are they?

In school we do not generally give students a fair and accurate picture of how government functions; for example, the question of federalism. Governments respond at different levels to environmental concerns. In school we act as if the different levels operate independent of one another. This is not an accurate description of a process by which governments cooperate and conflict with regard to issues. Environment is no different.

We also teach in terms of three branches of government:

legislative makes laws,
executive carries them out, and
judicial settles disputes.

VINCENT MARANDO

POLITICAL SCIENCE

This is not generally how government works. Legislative has lost initiative to executive. Is the legislature the place to launch protest? If you are really concerned about environmental matters, you should possibly manifest protest with the executive branch where policy is being made.

Policy is usually made by leaps and bounds. The public wants quick response. Legislative response is slow, adding on to what had gone before, except in case of great catastrophe. Only in times of a great depression or rioting in the streets can we get a massive response. I'm not sure that environmental issues are of this magnitude.

With a current budget of $240 billion, there is very little we can do. Most funds are locked into existing programs. Is environment more important than the programs currently receiving aid?

With respect to curriculum in the schools, maybe we'll start to build a two-fold foundation; one giving students information concerning their environment, and another giving them information on how public decisions are really made in this country.

PAUL KELLY

SOCIOLOGY

From the sociological point of view, human ecology is concerned with man and his environment, or man in his environment. Included are the natural, physical environment without man-made modifications and with man-made modifications, plus the social environment or milieu created by the presence of man in the physical environment. There is a constant interplay between man and these several environments. It is a reciprocal relationship, with each affecting the other.

As a biological organism, man has adapted to the physical environment, making necessary adjustments to it by a long process of evolutionary development or a shorter process of cultural development, or some combination of the two. Perhaps we have been too successful in adjusting to or conquering our environment, in conquering many diseases, decreasing infant mortality, increasing life expectantcy, and raising our "standard of living." In more advanced societies, such as our own, the environment itself has been drastically changed to better suit the needs of man--dams, canals, irrigation, etc. We have come to realize with alarm, however, that man has brought about inadvertent, unintended, and wholly detrimental changes in his environment through over-population, industrial pollution, misuse of and destruction of resources, and the like. It is this matter with which we are now chiefly concerned. The strontium in the milk, the

mercury in the water, the lead in the air are there in the dangerous levels we now find because of the acts of men, not because of the acts of God. It is up to men to reverse this dangerous trend toward ultimate self-destruction. It is those sciences which deal with the behavior of men, psychology, and sociology, for example, which may supply the means of change. Improved technology will, of course, play its part, but only in the hands of properly concerned and right-minded men, for we have at hand already the means for saving ourselves as well as the means for destroying ourselves. The choice which will be made depends very little upon technology, it depends upon the will of men.

This is the message teachers must bring to their students, There is, I think, a sign of genuine hope in the fact that today's students seem to be very receptive to this meessage. Indeed, some seem to be ahead of their teachers and their parents and to be providing significant leadership in bringing about a greater ecological awareness than we have ever before experienced.

FROM THE RESPONSE OF MATT SMITH:

I can't conceive that technology can solve all our problems. If we conceive of space-ship earth as a closed system with a finite number of limited resources, we will gradually come to the logical conclusion that technology is not the panacea for homo sapiens on earth.

Our society is oriented to a short-term economy (what's happening now) and does not appear to be concerned with the long-term economy, or what you'd call conservation. I wish you had mentioned something about solutions--long term or short term--are the best solutions direct controls, taxes, or what?

When you balance things out, like the marginal social cost to society for producing goods, can you balance that with the marginal social benefit? I feel that too many times today the social benefit is far less than the social cost.

FROM THE RESPONSE OF E. L. CHEATUM:

The moon shot gave us a new perspective of the planet earth. Recall the comments of the spacemen in seeing earth as they were coming home--they saw how finite the earth was--how precious it was. Millions of people watching on television had the same feeling--they shared that experience. This new perspective is what is growing fast, and this is what gives us hope.

The young people are the ones that reap the new perspective. They will point the way. We'll help and we'll be behind them with our particular disciplines and our particular insights, but its the young people who will really find the solution.

IMPLEMENTING CURRICULUM CHANGES

Elmer Williams, Chairman

Introduction

As man enters the crucial years of the 1970's, he leaves a scene marked with "cities. . . of smog and festering slums; rivers and streams turned into sewage conduits; strip mining despoiling the country-side; mountains of garbage accumulated around cities; and bulldozers clearing the way for new highways, houses and factories. . .scraping bare millions of acres of hills, woods and valleys until it seems that there will one day be little but pavement and monotonous sprawling suburbs from sea to shining sea."[1] The "man" who has "painted" this picture must now be made to realize that time is indeed fleet if such situations as those described above, and countless others, are to be rectified with any degree of success.

Two distinct problems are immediately encountered. First, millions of citizens are not really aware that environmental problems even exist. Even though they see smog enveloping their city as they drive to and from work and even though they can no longer fish and swim in rivers and lakes now filled with harmful impurities, they are unable to recognize that such situations need attention. Secondly, many Americans are unaware of their potential role in alleviating environmental ills. These include the many people willing to join the cause of cleaning and protecting our environment if only they knew appropriate channels and actions for their energies. Also prevalent are those who are aware of the seriousness of the situation and who do know what can be done but yet refuse to take any action.

The implementating of educational experiences aimed at making the American public cognizant of both the environmental problems of their country and their potential role in alleviating them has become a matter of vital concern to the general welfare of the people. In this section of the conference proceedings several individuals describe some existing educational programs designed to build awareness and concern for the environment and explore some of the kinds of curriculum changes that may be evidenced in future environmental education programs.

National Park Service Educational Programs

R. Alan Mebane

The national parks are an integral part of the environmental education movement. The National Park Service has developed two environmental education programs designed to help elementary and secondary students understand the relationship of man and his environment and to lead them to adopt an environmental ethic. These programs, called the National Environmental Education Development (NEED) program and the National Environmental Study Area (NESA) program, have been tested nationwide for approximately three years.

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[1] The President's Council on Recreation and Natural Beauty, From Sea to Shining Sea (Washington, D.C.; U. S. Government Printing Office, 1968), 11.

Under the NESA Program the Park Service has 85 locations throughout the Park System that are used on a day-use basis by local school systems as environmental study areas (ESA's). After establishing an ESA in a national park, the Park Service holds a workshop to introduce teachers to the philosophy of the program and to the physical layout of the area, to discuss how the area can be used within the existing curriculum, and to provide hints on how to manage children outdoors. Park Service personnel do not tell the teachers what to do but instead assist teachers in developing school curricula in various disciplines by discussing how the ESA can be used to help children observe concrete examples of patterns of structure or behavior, similarities and differences, interaction and interdependence, change and continuity, and adaptation and evolution. Once a program is set up, classes visit the various ESA's as frequently as the curriculum and budget allow. The classes go to the ESA's by bus and spend the school day there, taking their lunches with them. Teachers assume full responsibility for teaching the class and for relating the experience to the curriculum by presite and postsite discussion with the students. One ESA is located in the Kennesaw Mountain National Battlefield Park near Marietta, Georgia.

The NEED program, funded by the National Park Foundation, is developing teaching materials and a program of studies and experiences in three phases for kindergarten through high school to help enrich already-existing curricula with environmental concepts. Also an interdisciplinary program, the NEED materials guide teachers in how to teach about the environment in every subject area. In phase 1 - what could be called the "awareness phase" - during grades kindergarten through 6 the focus is on understanding and appreciating the natural and cultural environment. In the second, or "technical phase," seventh and eighth graders study man's use and abuse of air, water, land, and other resources. Finally the "ethical phase" stresses for high school students the need for environmental management and planning--the development of an environmental ethic.

Throughout the NEED program students may go on local field trips to supplement their classroom studies, and sometimes during the fifth or sixth grade the children spend five days with their teachers in some natural area (perhaps a national park). The original intention of the NEED program was to get the children who needed this experience most--inner-city children--out into a natural study area for an entire school week.

In both the NEED and NESA programs the emphasis is not on identifying or labeling, but on discovering patterns of the structure or behavior. For example, by recognizing similarities and differences, a child will discover the various patterns these characteristics make. Hopefully, this discovery will lead him to see basic interactions and interdependencies that are operative in his own environment and may lead him ultimately to help the community effect constructive changes toward a balance of the natural and man-made worlds.

Both the NESA and NEED programs emphasize man's relationship to his environment--and specifically the child's relationship to his environment. The programs aim to help the child learn from his outdoor experience how the ecosystem he observed works, draw parallels to see how he fits in his ecosystem (whether rural, suburban, or urban), and realize that the same laws govern all ecosystems. For each child the programs are designed to answer the question, "What does this matter to me?"

NEED materials are being commercially published by Silver-Burdett Company. The materials can be observed in action at the Job Corp Center, Tremont site in Great Smokey Mountains (operated by Maryville College) and at Cumberland Gap, Middleboro, Kentucky (operated by Union College).

Land Between the Lakes,
Tennessee Valley Authority

John R. Paulk

In 1963, after expressing the great need for more outdoor recreation land to serve our rapidly growing urban society, President Kennedy assigned TVA the task of developing Land Between the Lakes as a national demonstration center in outdoor recreation and conservation education. Land Between the Lakes is a 170,000-acre heavily forested strip of land between Kentucky Lake and Lake Barkley in western Kentucky and Tennessee.

Although conservation practices are demonstrated throughout the peninsula, it is in the Conservation Education Center that the aims and objectives of the overall conservation program are being brought into focus. A major facility within the Conservation Education Center is the Youth Station.

The basic purpose of the Youth Station is to introduce resident outdoor and conservation education programming to as many educators as possible. Through this introduction these teachers and administrators have experienced an innovative approach to education which provides direct and firsthand learning experiences for their students. The Youth Station will not solve all the schools' problems in regard to educating today's youth to become more aware of the world around them. It will, however, direct those who use it along the path to a solution. The programs developed by the user school systems in cooperation with the conservation education staff in Land Between the Lakes are a concerted effort to insert the ever-present world of one's natural and cultural environment into the existing curriculum through the utilization of natural phenomena and the outdoor setting.

Several basic objectives have been established for the Youth Station. They are as follows:

1. To introduce outdoor and conservation education to school systems as good education that is a part of the total curriculum and is integrated with all areas of the on-going school program.
2. To demonstrate that an outdoor education resident facility utilized as part of the learner's total education provides learning and living experiences which enable students to develop better academic success and attitudes toward life.
3. To promote an attitude of environmental awareness and develop a sense of responsibility and interest toward our environment and natural resources.
4. To provide a setting and atmosphere for assisting the professional educator in achieving the following basic objectives with students in his charge; self-realization, human relationship, economic efficiency and civic responsibility.

5. To provide a facility where school children, generally in grades 4 through 9, and their leaders may reside and participate in their own outdoor education programs and projects.

The Youth Station, a resident facility for conducting educational programs in outdoor and conservation education, officially opened in April, 1966. Since that time, approximately 15,000 individuals have had the opportunity to become involved in programs designed to develop a greater awareness and gain deeper insight into the natural environment through confrontation with problematic situations. This educational facility consists of one dining hall and kitchen building, six all-weather cabins, and one resource materials building. Capacity of the unit is seventy-two people. It is designed to contain two classrooms of students and their instructors.

A professional staff provides guidance for use of the facility and area by working with potential users. Their input into program preparation with each individual school lends support to teachers and administrators who have little or no experience in outdoor and conservation education. From within the framework of the Conservation Education staff comes promotion, program design, implementation and facility management of the Youth Station.

A promotional effort was initiated to ensure proper use and school participation at the expected levels. Contacts with school administrators were made at all levels--local, regional, and state. As a result of this effort, students representing four states--Kentucky, Tennessee, Illinois, and Indiana--participated in outdoor education programs at the Youth Station. The original concept of the Youth Station, introducing outdoor education programs on a broad regional basis, has curtailed local use to a great degree. For example, a local school system, such as the Paducah Public Schools, could make use of the Youth Station or a similar facility full time during any given school year. Many school systems in the region, in addition to the Paducah Public Schools, have made excellent use of the Youth Station. Evidence of sound curriculum development for outdoor education programs is becoming apparent within all user groups and points to the strong support given each school by the administration to implement their outdoor education programs. The progress in curriculum development is an outgrowth of multiple trips to the Conservation Education Center and the Youth Station.

As the Youth Station moved rapidly into program implementation, it was recognized that an important first step was that of school administrator and teacher orientation since many of these in-service professionals were unaware of the potential of outdoor learning opportunities. Approximately 1,600 teachers and administrators from schools representing seven states, including teachers from most of the states represented at this conference, have felt the need for outdoor education strongly enough to attend summer workshops instituted at the Youth Station. These workshops are designed to show how the outdoors can be incorporated into the curriculum.

An additional effort to stimulate teacher education and develop an awareness of need for teacher preparation in the field of outdoor education has been made through colleges and universities. As questions concerning the

environment and man's influence upon it became more pertinent, many institutions of higher learning initiated programs to prepare individuals to teach in the out-of-doors. However, this handful of progressive institutions will not produce enough qualified personnel to fill the existing void in today's public schools. Many disciplines, including elementary and secondary education, science, humanities, agriculture, recreation and others, are realizing that those curriculum areas and portions thereof can best be taught by direct learning experience within the natural and cultural environment. The Youth Station has given approximately 1,500 college students the opportunity to participate in observation and study of on-going public school programs in outdoor education. The station also serves as a training area for the college and university classes and gives them an opportunity to learn methods and techniques for outdoor teaching in a natural setting. Most of the participating colleges and universities do not have a curriculum or a department which prepares students to teach in the natural environment.

Professional organizations and Federal agencies are also aware of the Conservation Education Center program. Organizations such as the Conservation Education Association, Association of Interpretive Naturalists, Association of Health, Physical Education, and Recreation, Audubon Society, National Wildlife Federation and many others were contacted. In many cases the conservation education program was presented at annual or regional meetings of the various groups. As the program developed, most of the Federal resource agencies have sent groups of observers to see and study the facilities and program.

The Youth Station is a contribution to the field of conservation education. It provides a facility that has accommodated thousands of students and teachers who have participated in educational programs relating to the environment on the broadest scale.

Curriculum and Supervision
University of Georgia

Martin McCullough

How do you get into the business of environmental education?

(1) How do you design an instructional program?

- A. Major vehicle for learning-problem solving
- B. Highly structured inputs
- C. Encourage independence
- D. Activity oriented

(2) How do you train teachers to teach about the environment?

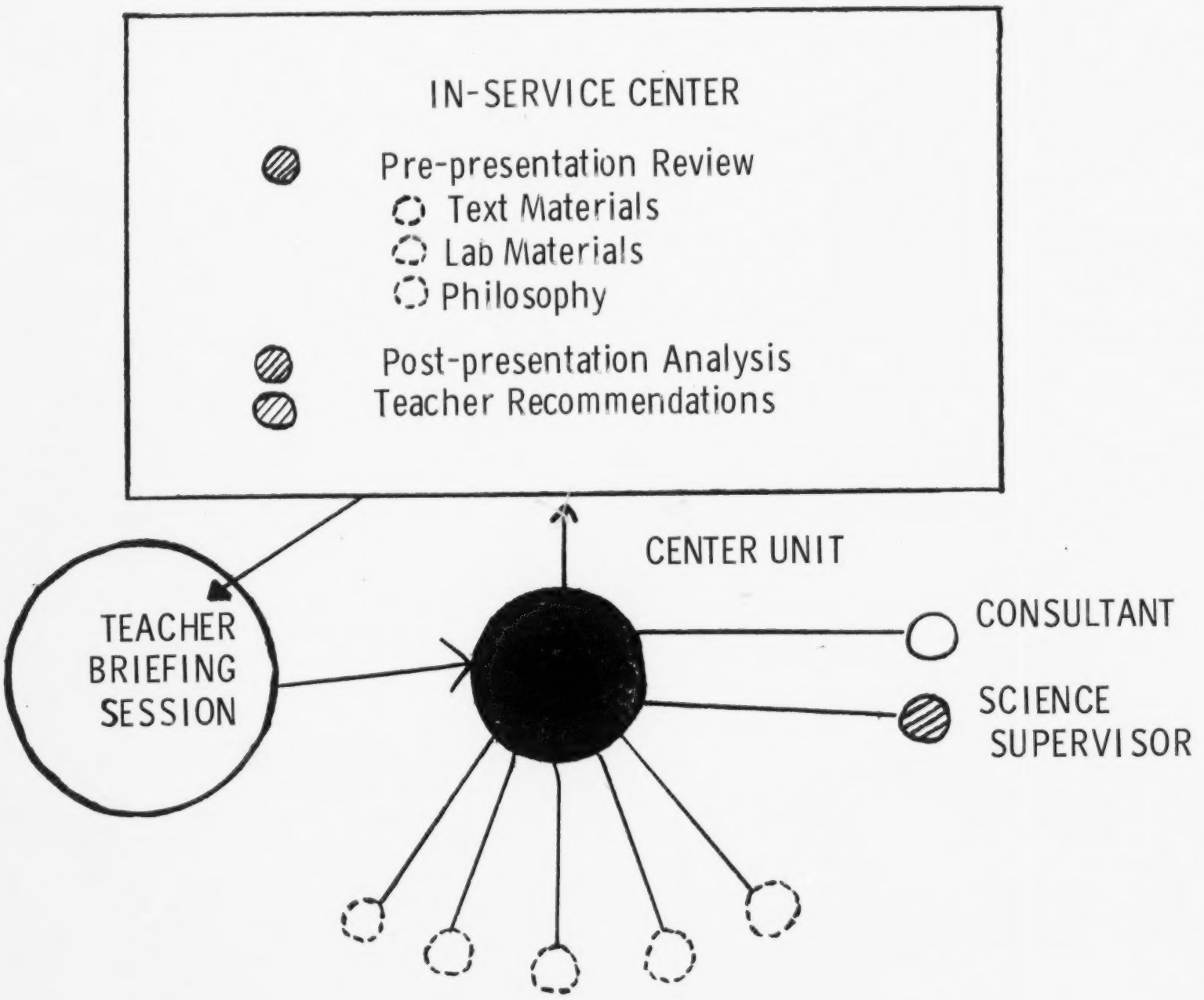
- A. Develop a cadre of people with commitment
- B. Differentiated staff approach
- C. Consider use of older youngsters as field guides

(3) How do you evaluate and implement an environmental education program?

- A. Feedback sheets
- B. Some kind of support system needed
- C. Provide transportation and administrative arrangements
- D. Need leadership from someone fairly high in the educational system's power structure

Science Education
University of Georgia

John Shrum



Brentree Environmental Center
Milford, Pennsylvania

Matthew Brennan

In developing a strategy for education for an environment of quality, let us make one major assumption. If man is the only living thing which can consciously transform, manipulate, control, preserve or destroy his environment, then a knowledge of how he affects his environment and, perhaps even more important, of the consequences of his actions should be an essential element of human understanding. It is not, and the reason it is not represents a failure of American education.

What is environmental education? It is all that education which develops in man a recognition of his interdependence with all of life and a recognition of his responsibility to maintain the environment in a manner fit for life and for living--an environment of beauty and bounty in which man lives in harmony. The first part of environmental education involves development of understanding the second, development of attitudes--a "conservation ethic."

Understanding the environment and man's activities in it certainly involves the sciences. But many scientists have themselves learned that decisions regarding man's actions in and use of his environment and its resources are not always made on the basis of scientific knowledge. We have the knowledge to solve most of the new environmental problems. But decisions are being made, and will increasingly be made, on the basis of social desirability, economic feasibility, or political expediency. The social sciences must therefore also be an important segment of environmental education. And since natural beauty, esthetics and the ennobling elements of the environment are receiving increased attention, the humanities must come within the purview of our program. Most important, we can no longer segment our subjects. Discussions of population, pesticides, pollution, and poverty of the environment are by nature interdisciplinary.

We are really talking, then, about a new kind of education--I call it education for the total environment--which involves understanding of the external environment. But, if we are to accomplish the second part of environmental education, the development of a "conservation ethic," an attitude of responsibility for the environment--then our education must involve the inner environment of the child as well. We know that life styles and attitudes are formed at an early age. The reasons why people "conserve" are internal, and we fail if we do not develop in children a good inner environment. Why should the child who has not been conserved be concerned about wilderness, California condors, or Antarctic penguins? Where is esthetics taught in our schools?

To attain our objective--education for the total environment--we must develop total environments for education. Obviously the most efficient laboratory for experiences in search of meaning in the environment is the environment. Yet, in most schools every element of the school facility but the surrounding environment is used. Our teachers are trained to use textbooks, guides, machines, media equipment, indoor laboratories--but never the real laboratory just outside the school. In most schools, the teacher is discouraged

from using the surroundings as a laboratory. He can make TNT in the laboratory and be fully covered by insurance if the school blows up. No parental permission is required. Yet, if he wants to take his class out-of-doors, he needs both parental permission and insurance against injury. Is it any wonder the average American knows little about his environment?

The outdoor laboratory must become an essential element of every school facility, extending eventually into the community. Here learning can go on naturally. Here the child can fail without penalty--and learn from his failure. Here he can become part of his environment and his environment a part of him--it will conserve him; he will conserve it.

What understandings are we talking about? Three great conceptual schemes govern all life on earth, including man:

1. Living things and environments are in constant change.
2. Living things are interdependent with one another and with their environment.
3. Living things, or populations of living things, are the product of their heredity and their environment.

Although these concepts are complex in nature, an understanding of them and their relationship can be developed quite simply, in this way:

Since man is the principal agent of change in the environment, we can look for rapid changes as a result of his activities. Children can be taught to look for change. Change results in a new environment. Now we must look for consequences, since all living things are dependent on their environment. What effect does the change have? Can we predict it? Did we foresee polluted water from detergents that gave us the whitest washes in the world? Did we foresee DDT in the tissues of Antarctic penguins when we sprayed the forests and farms of America to control insects? We must expect consequences when new environments result from change.

Finally, we must try to determine how living things will survive in the new environment. Not all living things have been adapted for life under changed conditions. Our list of endangered species is long. Perhaps man may be on the list; some scientists believe so. Can man survive the pollution, poisons, crowding, noise, etc., that he has introduced into his environment?

Excerpted from "Making Tomorrow Now: Building a Qualitative Environment for All Children," Childhood Education, October, 1970.

Citizen - Consumer Response

Joy Lee

A few thoughts as to what some curriculum changes might be:

1. Natural areas as part of a school system's property, wherever possible. Land will never be cheaper, and if students are really to understand the environmental problems, they will need to have an understanding of Nature. Walks around the block and field trips into the neighborhood are effective, but you can only illustrate the enormous variety and put man in his proper place in larger natural settings and areas. If it's possible, we should always aim for the best experience and not be satisfied with leaving a child in his own environment if there is a chance of letting him experience a richer one.

2. Curricula should try to encourage ecological thinking, or multi-tract, multi-effect thinking. We should train minds for flexibility and teach how to weigh, sort and sift information.

3. Decision making is one of the environmental problems. Poor decisions often cause or aggravate problems. Students should be given the opportunity to both observe and participate in environmental decisions being made in the school and in the local community. This way they can determine if their community is facing problems and will come to see how difficult it often is to reach an environmentally favorable decision.

4. Local communities should be surveyed for problems, and if it looks as though one of these problems might benefit from some hard work being done on it, then school permission should be sought for such an activity. Students will have much more of a feeling of belonging to a community if they are allowed to participate in it. They may even recognize that the community needs them and they need the community. Real data should be collected, analyzed and discussed. If students are to work in the community, part of their training will need to be in how to deal with people; such things as manners, tactfulness, etc. They need to understand the importance of making friends, not enemies, so that results can be utilized (politics).

5. Curricula should include a section on what might happen if we do not make hard decisions on salvaging the environment. We should prepare students so that if miracles do not happen, they may be able to cope with the problems of the next 30 years.

CURRICULUM APPLICATIONS

Notes from Group Meetings

College — Howard Daugherty

How do we respond to environmental problems at university level--with scare tactics? Man is not equipped to withstand continued psychological stress.

Not much is being done at the undergraduate level. Need coordination, inputs from science and humanities, interdisciplinary approaches. Department working in isolation leads to repetitions and overlap.

Need to break from tradition. If there is to be curriculum change, must have expression of need from students.

Secondary — Stanley Bergquist

Various aspects of agreement:

Environmental education should be cross- or inter-disciplinary. There must be involvement with built-in values and sense of responsibility for decision-makers of very near future.

Emphasis should be placed on urban environment where largest segment of population lives.

Those who promoted a cross-disciplinary course interrelated with all other areas of K-12 were criticized as being too unrealistic and not pragmatic.

Middle and Junior High — Robert Forney

Center discussion around two questions: What are we doing? What can be done?

1. Children's eyes must be opened to their immediate environment--the urban and suburban school.
2. We must break down discipline barriers and think of environmental education as eccompassing all areas of the curriculum. Think of the child--not the discipline.
3. We must try to clarify the real problem of our environment. One person suggested this formula in expressing the relationship of standard of living to environmental quality.

$$EQ \approx \frac{1}{\text{Population X Energy Consumption (per capita)}}$$

We must try to make students aware of this relationship.

Youngsters must understand the concept of cycles--environmental, economic, etc., and that choices must be made--value decisions.

Total Involvement:

Resources:

1. Field trips
2. Corp of Engineers
3. Sesame Street
4. Kids themselves

Implementation:

1. Involvement of Kids
   (a) Changes of life cycles
   Example: recycling beer cans
   (b) Approaching government agencies - need for new recreational lands - surveying lands, etc.

Recommendations:

1. A clearing house where good ideas could be shared throughout the southeastern region.
2. A unified effort on the part of all teachers in each discipline to come up with an overall approach rather than a hit or miss effort.

Elementary — Jeannette Moon

Stressed the need for units and materials which will allow teachers to go in a number of open-minded directions.

Student Presentations: A Reaction — Everett T. Keach, Jr.

The creation of a curriculum for environmental education has to overcome several hurdles before it becomes a reality in American education.

The conference presentations of the fourth-grade children from Oglethorpe School and the seventh-grade students from Lyons Junior High School illustrate dramatically the dimensions of the problem for this writer. Their presentations were based upon environmental problems that were unique to each school. These problems were considered as incidental to the regular curriculum, but pupil interest was sufficiently high that the teachers, Mrs. Bridget Withers and Mrs. Emily Eberhart, were quick to build several observation activities around the incidents. Under the teachers' guidance, the pupils engaged in the process of data collection and analysis during those times in the day when it did not interfere with the curriculum. It is to be recorded that the activities took place, at times, at the "expense of the established curriculum." For the most part, both groups worked on this project during that part of the day normally allocated to the "social studies curriculum."

In this example, we can note that one constraint to the establishment of a developmental curriculum in environmental education may be the absence of adequate guidelines. Either there are few guidelines adequately understood by those in curriculum decision-making positions for incorporating this type of an educational experience within the curricular structure, or the guidelines for teaching environmental education lack sufficient specificity to give direction

to those interested in a developmental program for the schools. In either case, there appear to be at least three areas which need to be delineated in greater detail for a thorough understanding of the need for and the implementation of an articulated environmental education curriculum for the schools.

The first of these concerns itself with the description of the body of knowledge most applicable to environmental education. To say that environmental education is education for the total environment implies coming to grips with the knowledges of the fields of the social sciences, the humanities, the physical and the natural sciences. The problem facing those interested in developing programs is the one of selection. What concepts, generalizations and processes are we to extract from these fields of knowledge which will have the widest applicability for the individual? This is not to say that there are no available suggestions for the curriculum developer. The National Environmental Education Development (NEED) program identifies the following strands around which to organize educational experiences: [1]

Varieties and Similarities

Patterns

Interaction and Interdependence

Continuity and Change

Evolution and Adaptation

Along similar lines, Brennan has listed several generalizations that should serve as organizing elements for the curriculum.[2] Still others have suggested objectives which include some of the above ideas stated in behavioral terms.[3] The need still remains, however, for more clarity in delineating those concepts, generalizations and processes to be included in a viable environmental education program. Unless specific cognitive goals are delineated by those with the knowledge base, program development will be haphazard--and possibly uninviting--for the educator.

In addition to the need for clarity in the identification of concepts to be taught in environmental education programs, attention must be given to structuring a program that is action-oriented. Many of the programs being used today are "awareness-oriented." Typical of these programs are those which have developed around themes such as conservation education or outdoor education. To make people aware of the happenings in their environment is a necessary first step. The ultimate goal, however, ought to be the development of a commitment

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[1]Taylor, William M. Applications of the Strands to Writing Environmental Education Objectives, Draft 1, National Park Service, Western Region, December 21, 1970, mimeo.

[2]Brennan, Matthew, J., ed., People and Their Environment, 8 vols., (Chicago; J. C. Ferguson Company), 1968.

[3]Final Report, International Working Meeting on Environmental Education in the School Curriculum. International Union for Conservation of Nature and Natural Resources, September, 1970, pp. 21-23.

to work toward the remediation or elimination of conditions identified as deleterious to the man-environment relationship. The students who presented their conclusions during this assembly were action-oriented in that they wished to describe an environmental pollution problem for us. Their work, however, was an exercise in awareness. On-going activities to carry their tentative findings forward for additional testing and refinement which would culminate in a final recommendation or action-project did not become part of this project. It should be mentioned that several students did comment about ways in which they might move forward with the project. The point to be made is that, in the absence of a structure of activities leading from the "awareness" to the "action" stage, much of the effectiveness of an environmental education program is lost. Yet, the need for environmental education programs is always couched in terms of educating an individual who will not only be committed to improving his social and physical environment but will be motivated to demonstrate this commitment. Program development will not be effective until teaching strategies are included for developing in the individual a willingness to act in the private and public sector in behalf of environmental quality.

A third area that needs to be considered in developing a sound curriculum is that of skill development. Perhaps this area should have been included in the previous comments, for skills such as those of critical thinking, decision-making, etc., are intertwined in the curriculum that is action-oriented. Environmental education curricula should provide the teacher not only with the strategies for teaching these skills but some suggestion as to the heirarchical arrangement for the introduction of these strategies. If we ignore this dimension of the curriculum, we will be placing severe restrictions on future generations' abilities to cope effectively and efficiently with environmental problems.

These student presentations attest to the willingness of students and teachers to attend to the problems encountered in their environment. They are willing and eager to engage in the process of identifying and understanding thier relationship to the physical and social world. If we can develop curriculum for them which provides a viable conceptual framework, is action-oriented and focuses upon the development of inquiry and decision-making skills, we will be in an admirable position to work toward the environmental quality necessary for a productive and satisfying life.

Closed Circuit Television Applied To Environmental Education

David Jacobsen

A broad definition of media covers everything a teacher utilizes in the course of his instruction. . . including his students as well as himself. Most media instruction is of an A-V nature which involves presenting stimulus materials to the students within the classroom setting. All too often the teacher is unable to transcend the physical boundaries of the four walls and campus and a vast learning resource, the environment*, is lost to the student. How can these surroundings be brought to the student and in what ways can the environment be integrated in his learning experiences?

One instructional approach which lends itself to the solution of these problems is closed circuit television. Breakthroughs in the use of CCTV and production and distribution of one-half inch equipment at a reduced cost have enabled school systems, district A-V and media centers, universities, etc., to purchase and make available this equipment to instructors. This position is supported by the increased activity of corporations in the CCTV field. For example, more than twenty corporations exhibited CCTV equipment at approximately 100 booths at the Association for Educational Communications and Technology (AECT) convention held in March of this year. The materials included everything from video-tape recorders, tape, cameras, and sophisticated dissolve units to dolly-lite systems.

The amount of programs used in public schools has dramatically increased and some districts are deeply involved in the production of local instructional materials. Micro-teaching has provided the impetus at the university level. In short, CCTV is not some dream on the educational horizon; it is an increasingly practical and available instructional tool.

CCTV can be used in many ways to facilitate environmental education; however, I would like to briefly mention two broad applications. The first deals with environmental education for its own sake. CCTV can be used to record the environment and bring it into the classroom for analyzation, discussion, etc. The instructor and/or small groups of students involve themselves in problems such as conversation, pollution, over-population, etc., and apply these concepts to their immediate, real situation. Tapes are played for the entire group(s) and hypotheses or generalizations are formulated. The overall picture may not be taken into consideration and data collected for acceptance or rejection. These kinds of experiences are active and relevant yet at the same time deal with topics and materials which are traditionally taught in the schools. Field trips have been relied upon to accomplish similar tasks but due to a wide range of problems, class outings are too narrow and too few. CCTV allows the student to experience the totality of the qualities and aspects of his environment and to acquire a working knowledge of the problems related to environmental quality.

The second application I have in mind is that of utilizing the environmnet as a vast resource for instruction in other disciplines. Surely the entire range of the social sciences can be explored in any given environment. . .and CCTV can capture these facets and present them as learning exercises in a quick,

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*Each individual interacts with a multitude of environments but, for the purpose of this discussion and in keeping with the Southeastern Regional Conferences, let us limit the term to the local (city, town) ecological surroundings of the student.

effective fashion. It takes little time or effort to envision the endless ways the environment could be used in art instruction, grammar development, mathematical applications, biological explorations, etc.

In a day and age when students continually question and challenge the relevance of their learning tasks, it becomes clear that bringing the environment into the classroom, for its own sake or for subject matter applications, is an effective way of providing meaningful educational experiences. . . experiences which will help us to motivate the student and better prepare him for an active role in the real world.

Simulation Games — David Pierfy

The annotated list of environmental education-simulation games[1] was compiled from two major sources. First, inquiries were directed to the major centers involved in simulation game production. These producers were asked to describe any games they had designed which could be used to teach conservation education, environmental education or ecology. An extensive survey of the literature concerning simulation games was a second source of information contained in the following bibliography. A modified version of the format employed in the Foreign Policy Association booklet, Simulation Games for the Social Studies Classroom, was used to present the information.

[1]Only non-computerized games are included in this bibliography.

Southeastern Regional Conference
The Social Sciences and Environmental Education
April 4-6, 1971

University of Georgia
Social Science Education
David A. Pierfy

Bibliography of Simulation Games For Environmental Education

Game	Contact	Level	Descriptors	Notes
Balance	Interact P.O.Box 262 Lakeside, Calif. 92040	Junior High Senior High	The concept of ecosystem is introduced by simulating the last 150 years' history of an American geographical area. A city evolves with a population of over 100,000 and many ecological problems. Within this setting students role-play families in the area as they try to decide what to do about problems of pollution, population, etc.	Like other Interact simulations, Balance emphasizes learning through involvement and interaction. Cost: $10.00
Colossus, The City Game		Adult	A brief description of the city as it is today surveys Colossus' major problems. The player then selects 16 changes (from a list of 50 Action Steps) he would like to make in the city during the next 20 years.	The game was developed for Look magazine by Western Behavioral Sciences Institute in an effort to find out what kinds of changes Look readers want to make in American cities. Look, June 11, 1968, pp. 104-5.
Dirty Water	Urban Systems Cambridge, Mass. 02138	High School (junior & senior)	The game board consists of 4 lakes in ecological balance. Each player must control pollution and overpopulation in order to maintain that balance.	Participants role-play city water quality controllers. Cost: $10.00

Game	Contact	Level	Descriptors	Notes
Ecological Math Game		Elementary (Grade 1)	Paper clips are fastened to fish made of construction paper and dropped into a cardboard box which simulates a pond. Computational practice is provided by the unfinished number sentences on the sides of the fish and at the same time children can be learning about water life.	Adapted from "Fishing for Number Facts" in the Teacher's edition of Seeing Through Arithmetic, Book 1, Scott, Foresman; by Sandra Schlachtmeyer in Primary Activities, Winter, 1971.
Ecology	Urban Systems Cambridge, Mass. 02138	High School	Players try to achieve a balance between man's activities and the environment, while advancing through four Ages of Development: Hunting, Agricultural, Industrial and Environmental.	Cost: $10.00 2-4 players Playing time: 30-45 mins.
Farming	The MacMillan Company 866 Third Ave. New York 10022	High School	Participants in the game become managers of a farm in Kansas during three different time periods. The emphasis is on decision making.	The game is included in Unit 2 of Geography in an Urban Age developed by the High School Geography Project. Playing time: 5-7 (50 min) periods. Number of players: 15-30.
Five Corners, U.S.A.	The Match Program The Children's Museum Boston, Mass.	Elementary	The game simulates a problem-common to numerous American communities. What route should the Interstate follow?	The game kit ("The City") includes a three-dimensional model to provide concrete reference for elementary students.

Game	Contact	Level	Descriptors	Notes
Make Your Own World	Your local Coca-Cola Distributor	Upper Elem. Jr. High	Players discuss and vote on proposed changes in the community, for example, a superhighway. The simulation is designed to develop the students' appreciation of man's interdependence with the environment and to help them be aware of the decision making processes that affect their environment.	Besides role-playing the important personages in the community, some students are assigned to argue from the point of view of the flora and fauna of the area.
Metfab	The Macmillan Company 866 Third Ave. New York, N.Y. 10022	High School	The multiple factors involved in locating a factory are investigated. The availability of raw materials, labor, and potential markets is studied along with shipping costs involved.	Like the game of Farming, Metfab is included in Geography in an Urban Age (High School Geography Project). Playing time: 5-7 (50-minute) periods. Number of players: 5 to 10 per group, depending on class size.
Pleasantville		Elementary (5-6 Grade)	Through role-playing the students vicariously experience the environmental dilemma of the citizens of Pleasantville. The case study approach is used to analyze the scope and nature of the problem. Simulation is employed to have the student reach a tentative solution to the problem.	Directions for the simulation can be found in the Journal of Geography, May, 1970, "Simulation and Inquiry Models Applied to the Study of Environmental Problems," by James B. Kracht and Peter H. Martorella, pp. 273-78.
Pollution	C. Abt Assoc. 55 Wheeler St. Cambridge, Mass. 02138	Elementary	The game's primary objective is to teach students the social, political, and economic problems involved in attempts to control polluation. Students role-play during the negotiation phase - the Town Meeting. Players must come to a decision about the technological means of pollution control.	The game is being tested presently in the Wellesley (Mass.) Public Schools. Number of players: 15-25 Playing time: 5 to 15 period of 45 minutes.

Game	Contact	Level	Descriptors	Notes
Predator-Prey	Urban Systems, Inc. Cambridge, Mass.	Elementary	Small playing pieces representing hares (prey) are placed on the field of play. Larger pieces representing the lynx (predator) are tossed at the hares. If a lynx lands on a hare, the hare is removed from play. If the lynx lands on nothing, he is removed from play (he starves). With each round the hares multiply by three. The populations fluctuate just as they do in nature.	
Rescue in Space	Local Coca-Cola Distributor	Upper Elementary Junior High	Two space ships make the long voyage to Mars. One of them becomes disabled forcing two crews to return in one ship. Consideration of food, water, air and space become paramount.	A section of the classroom can be marked off with string and designated as the interior of the space craft. Eight students play the roles of astronauts and the remainder of the class acts as Mission Control experts.
Rutile and the Beach	The Macmillan Company 866 Third Ave. New York, N.Y. 10022	High School	Mining, conservation, and recreation groups compete for land and resource use. The purpose of the game as stated by the designer is: to develop abilities in decision making, analysis, the art of compromise and to develop the concepts involved in dealing with complex interrelated ecology.	The game is part of Unit 5 of Geography in an Urban Age developed by the High School Geography Project.

Game	Contact	Level	Descriptors	Notes
Simpolis	C. Abt. Assoc. 55 Wheeler St. Cambridge, Mass. 02138	High School Adult	The game's objective is to communicate the meaning of major urban issues to the players, including possible responses to crises, and some of the consequences of such crisis decisions. In the course of the game seven major problems are introduced--transportation, education, housing, civil rights, poverty, crime, and pollution.	Fifty different role profiles (one page each) are provided. Players take the roles of key decision makers and interested citizens in the Simpolis, metropolitan area.
Smog	Urban Systems, Inc. Cambridge, Mass. 02138	High School	Players assume the role of Air Quality Manager. Decisions must be made concerning zoning, city growth, solid wastes, abatement procedures, and gasoline automobile-engine pollution.	Smog is designed for 2 to 4 players but the decision making functions can be allocated to team members. Cost: $10.00
Water Resources		Adult	A management simulation exercise designed for in-service training of California Department of Water Resources personnel.	Office of Industrial Development (OID) Management Simulation Exercise Department of Water Resources Sacramento, Calif.
Wildlife	Dept. of Conservation, School of Natural Resources, U. of Michigan Ann Arbor	College		A game designed by Richard L. Meier emphasizing ecological balance in nature. Meier also designed related games--Big Shoot and the Watershed Management Game.
World Game	Tom B. Turner Spaceship Earth Exploration by Design Science P.O. Box 909 Carbondale, Ill. 62901	Junior High Senior High College Graduate Sch.	Players assume the role of world designers and attempt to maximize and optimize all world systems without regard to politics.	The game was designed by Buckminister Fuller, hopefully to develop future environmental planners.

Materials From Government and Industry

William Bake

The educator trying to find resource materials on environmental problems should have little difficulty today. Far from lacking materials, the educator is faced with a considerable problem in sorting what he really needs and can trust from the lists of possibilities which confront him.

The surge of interest in environmental degradation which began in the late 1960's brought with it a wave of printed materials which now threatens to inundate educators. Compounding the problem, growth within the environmental movement has caused a confusion of reorganizations, mergers, name changes, and corporate births. As likely as not, names and titles on even a one-year-old source list will have been made obsolescent.

But materials are plentiful, and quite often all it takes to get them is a postcard. In fact, once the proper sources are discovered, they will produce a steady flow of propaganda, facts, and miscellany dealing with the environment.

The best source guide to environmental materials from government and conservation agencies is (and has been for many years) the Conservation Directory. This booklet, available for $2.00, is printed yearly by the National Wildlife Federation, 1412 Sixteenth Street, N.W., Washington, D.C. 20036. Each entry in the Directory--and there are hundreds--gives a capsule description of the organization in question and suggests exact source persons and addresses.

Industry, however, has no such directory. By and large, such a directory would be superfluous. Though industry has been loudly proclaiming its environmental concern over the public media, there seems to be very little educational material available from individual corporations. Only when corporations have created industry-wide public relations organizations are there likely to be educational materials. The American Petroleum Institute is a good example. At present, educators' guides to free and inexpensive learning materials are the most likely sources for lists of industry-sponsored materials.

When using these materials, it is wise to be cautious. Much of the material is propaganda--and not just from industry, but from some of the nation's most respected conservation organizations and supposedly "impartial" government agencies. With a little deft manipulation, logged-over lands have become "tree farms" and stream channelization has been labeled "stream improvement." Unless the teacher specifically knows the viewpoint of his sources, he is as likely to fall prey to their propaganda as his students.

The shortcoming, then, is not in material quantity, but in its quality. But then, quality demands detachment, which is, after all, a product of time and impartial application of the scientific method.

Selected Instructional Films — Mary Hepburn

Modern Talking Picture Service, Inc.
714 Spring Street, N.W.
Atlanta, Georgia 30308
(free loan films provided by industries)

Living With Today's Water - 27 min. color. Depicts the historical and accelerating causes of water pollution. It shows how the problem affects daily living and illustrates a need for refinement of water supplies. Introduction by Bennett Cerf. #3651 from Water Refining Company.

All the Differences - 20 min. color. Poetry readings of the beauty of America in the past are sharply contrasted with a dialogue in the polluted present. #3871 Eastman Kodak Co.

National Medical Audiovisual Center
Station K
Atlanta, Georgia 30324

A Matter of Attitudes - 30 min. free loan color. Reactions of people young and old from all walks of life who were interviewed about pollution. Their views reveal many of the subtleties and difficulties of pollution prevention and control. Produced for the Canadian Council of Resource Ministers.

King Screen Productions
Educational Division
320 Aurora Ave., N.
Seattle, Washington 98109

Treehouse - 8 min. color, sale $120, rental $12. Depicts a value conflict between preservation and development. A young boy resists the bulldozing of his treehouse to make way for a building project. The situation, presented without commentary or conclusion, should raise some basic questions about how we define "progress."

From the Face of the Earth - 11 min. color, sale $165, rental $16. This open-ended unnarrated futuristic fantasy should provoke some serious thinking about the implications for future life of the decaying quality of our environment.

McGraw-Hill Films
327 West 41st Street
New York, New York 10036

The Silent Spring of Rachel Carson - Parts I and II, 52 min. black and white, rental $15. A "CBS Reports" program dating back to 1961 in which Miss Carson and her critics including spokesman from the pesticide industry debate the effects of pesticides. With ten years hindsight students can analyze those claims which have been supported or rejected by increasing evidence and those which are still open to argument.

STATE ACTION REPORTS

Alabama

Marie Hendrix

The Alabama group was large--13 people. Everyone in the group contributed something about projects that have been tried or planned. The need for involving students in the community was frequently mentioned.

There are many individual teachers and local school systems who have become so conscious of the now need for action that work has commenced. Significant progress in the area of environmental education has not been accomplished but initial programs have been inaugurated which may serve as pilot endeavors. Forward thinking citizen-teachers are now doing something about this acute disorder.

Local action is exemplified in such activities as:

1. Classes in social studies and science have sponsored the preparation of community landfills and cooperated with the clean-up programs. But need student involvement beyond clean-up. Have not taught "why?"
2. Teaching units have been developed by individual teachers and in some instances by an education system. Need more communication to avoid duplication of effort.
3. Three school systems have proposed Title III ESEA projects to provide for outdoor education opportunities.
4. Higher education is currently offering a limited number of courses. Others are being designed.

Regional and State emphasis is indicated by the following:

1. Ten school systems of Alabama and one of Mississippi served by the Bear Creek Watershed Project and the Tennessee Valley Authority in cooperation with these agencies and the State Department of Education directed a series of outdoor education workshops for teachers. Similar learning experiences were later provided for both elementary and secondary students.

2. The Forestry Department of Auburn University, Alabama, Forest Products, and the State Department of Education sponsored a state-wide workshop to assist the teacher in analyzing the extent of the conservation problem in Alabama. Participating in a leadership capacity were geologists, archaeologists, Alabama Forest Products Association, U. S. Forest Service, naturalists, State Department of Conservation, and educators.

3. The Alabama Water Resources Research Institute in concert with the National Science Foundation, and the U. S. Department of Commerce conducted a seminar to identify Alabama's pollution problems. The report will concern itself with land quality and solid waste disposal, noise control and abatement, air and water quality and control.

4. The State Department of Education has initiated a State Planning Committee for the purposes of:

   a) Interchange of information among the various State agencies with assigned function or secondary responsibilities in environmental control as to each agency's contribution in this endeavor.

   b) Exchange of ideas relative to the role of public schools in meeting the needs of environmental education.

The following objectives have been identified to achieve statewide planning to promote environmental education:

1. Statewide planning, both long-range and short-range, operating through an Interagency Council and the State Department of Education.
2. Statewide evaluation.
3. Statewide dissemination, including data collection and the formation of a State data bank of environmental education information.
4. Statewide awareness permeating every espect of society.
5. Statewide teacher education.
6. Curriculum improvement in environmental education.
7. Promotion of community action programs.
8. Interagency Council on Environmental Education to serve as a clearinghouse for local, state, and national efforts.

Florida

Richard Tillis

Prior to the formulation of the Florida master plan for Environmental Education, a survey was conducted to determine the quantity of local environmental education programs operating in Florida. This survey was initiated in August, 1970.

A copy of the survey form was mailed to all district superintendents in Florida requesting information on any environmental education projects in their district. Information concerning project objectives, resources, programs and evaluation procedures was requested using the following definitions:

Objectives: The goals that were set for the program (general and specific).

Resources: The ingredients of the program - the nature and human resources, funding sources, facilities, materials, etc.

Program: The primary activity - the implementation of the objectives and use of resources.

Evaluation Procedures: Data, instruments, devices that measure the extent to which the objectives were met.

(Completed survey sheets for all districts which reported projects in operation this year are included in appendix for more detailed information on each project.)

The survey also requested that each superintendent designate one person in his district as a contact with the responsibility for dissiminating environmental education information within that district and named in a state-wide directory of persons responsible for environmental education.

An additional memorandum was mailed to all deans of colleges of education in Florida's state supported universities, requesting identifications of research projects in environmental education or courses on environmental problems in existence in their university.

The survey results have been compiled into a summary which includes the 67 district names, project titles, directors, type of program(s), grade level(s), and the number of students served by these projects. This summary indicates the present extent of environmental education in Florida schools, to date, as determined by our survey, with 59 out of 67 districts reporting. Twenty-two projects are presently in operation serving over 150,000 students in 29 counties. Environmental education projects may exist which were not reported and many courses in science, biology and social studies may be environmentally oriented but were not considered as "projects." This survey has been of a quantitative nature and no attempt was made to evaluate the quality or effectiveness of these projects.

In summary, findings indicate that many good things are being done on the local level, with varied approaches to study of the environment being pursued. Outdoor education facilities are available in some areas, and some courses in environmental problems are being added to the high school curriculum. Projects involving the school and the community have developed; field studies are being conducted utilizing a local problems approach, and departments are restructuring their curriculum so that it is environmentally oriented. On the other hand, activities in the field have been fragmentary and no school program, K-12 has implemented the comprehensive philosophy of environmental education. It is the primary objective of the master plan to create in an efficient and effective way, a uniform program of excellence in environmental education for Florida.

Specific Objectives Related to Stated Needs are:

TO develop an awareness among educators and the public of the existence and dimension of the environmental problems we face as a nation.

TO provide leadership and services to local school districts in designing and implementing a systematic plan to assure an effective, meaningful environmental education program.

TO evaluate and coordinate educational and informational efforts of all supporting and assisting agencies.

TO organize state and regional teams of environmental educators composed of professionally and occupationally qualified individuals who can make a contribution to improving the competencies of school personnel and personnel of other appropriate agencies.

TO employ the 'Triple T' (Teams Training Teams) or 'Multiplier Concept' for training critically needed teams for conducting inservice education programs in environmental education.

TO establish centers in various regions of the state for the purpose of assisting the Department of Education in coordinating environmental education activities in that region.

TO provide through the regional centers continuing environmental education training programs, services and exchange of related information.

TO adapt, adopt or develop new curricular materials, techniques and concepts in environmental education aimed at behavioral changes and student involvement in the development of decision making skills.

The accomplishment of these objectives will provide an opportunity to experience cooperation with state and community agencies in a total effort to help youth develop a positive environmental image and to develop the cognitive skills necessary for effective citizenship in this age of environmental concern.

Georgia — Dallas Stewart

In addition to this conference, there have been other recent conferences on environmental problems in Georgia. The Georgia Conservancy held a conference in Atlanta in January on "Environmental Challenges: Agenda for Georgia." The University's Department of Religion and Philosophy along with the Danforth Foundation presented a conference on "Philosophy and the Environmental Crisis" in February. Georgia Tech had a conference on Technology and the Environment in March.

The University of Georgia has significant resources for dealing directly with problems of environmental concern. It is beyond the scope of this report to go into the activities of the Institute of Natural Resources, the Institute of Ecology, the School of Environmental Design, the Institute of Community and Area Development, and the various colleges which are supportive of environmental education programs. For instance, the Cooperative Extension Service of the College of Agriculture has prepared a Georgia Nature Study and Conservation Directory. During Winter Quarter the University's Department of Geography and the Institute of Ecology offered an interdisciplinary colloquium on Man, Culture, and Environment. The Graduate Faculty of the University has recently approved an interdisciplinary Ph.D. program in ecology.

Other units of the University System are working on environmental education throughout the state. Valdosta State College with the National Science Foundation and the Georgia Natural Resources Education Council sponsors summer workshops for science and mathematics teachers and supervisors. A consortium of state colleges in southern Georgia is conducting a project, Georgia Steps Toward Environmental Quality. This H.E.W. Title I project is involving teachers and community leaders in conferences, workshops, demonstrations, and environment-day activities.

Georgia Southern College has established an environmental study area on some of the open lands on its campus. This facility is used primarily as a teacher education laboratory in association with the Marvin Pittman Laboratory School, a public elementary and secondary school on this college campus.

One private teacher education college, Shorter College, is also working with the Georgia Environmental Education Council in the same fashion as in the aforementioned Valdosta State College, giving instruction in a summer school program to elementary and secondary teachers in environmental education and natural resources use.

The programs of governmental agencies are numerous and varied. The National Park Service's Kenesaw Mountain facilities, which were reported on at this conference, can be incorporated into environmental education programs of surrounding school systems. The Savannah District of the U. S. Corps of Engineers has demonstrated an interest in environmental education programs. The Southeast Water Laboratory makes films, such as The Gifts, available for school use.

The problems of environmental education in urban areas was stressed in the Georgia group meeting. The environmental education activities in the

Atlanta Public Schools are particularly enhanced by the adoption of the four quarter system administrative arrangement. Short eleven-week length courses in environmental awareness are available as part of both science and social studies curricula. Field trips and camping tours to the mountains and seacoast are characteristically part of these courses without neglecting the environmental condition of the urban area.

The Fernbank Science Center, a function of the DeKalb County School system, owns a forty-acre climax front near the heart of the metropolitan Atlanta area. Trails and study stations through this forest are used for environmental education at all levels. College credit instruction is given through a cooperative arrangement with Georgia State University.

The State Department of Education has recently designated the Science Consultant as the state's Environmental Education Specialist. The need for an interagency Environmenal Education Planning Group is recognized. As in other states, plans need to be made for environmental education on a statewide basis.

Kentucky — Wendell Cave

Kentucky is making progress in environmental education. The state is fortunate to have two residential environmental education centers. The Land Between the Lakes Conservation Education Center, operated by the Tennessee Valley Authority, offers year round residential environmental education programs. The Union College Environmental Education Center is located in Cumberland Gap National Park and is using the facilities of a former Job Corp Center. It is operated by Union College, a private college, and offers a residential program in environmental education.

The Kentucky Department of Education and Natural Resources in cooperation with the Courier Journal, the state's largest newspaper, sponsor each year a state-wide essay contest dealing with a different aspect of conservation and environmental education. Last year's essay entitled, "Pollution - Its Effect on My Community," drew some 98,000 entries from all school districts in the state. Some $4,000 in prizes are awarded on the district and state level. About 150,000 newspaper tabeloids dealing with the subject of the essay are mailed to the schools in Kentucky. The tabeloid contains background information and a teaching unit. The subject of this year's essay will be, "Land Use - Its Effect on My Local Environment." Each teacher in the state has already been mailed four copies of the tabeloid and entry materials.

The Kentucky Department of Education is currently writing environmental education materials for use in grades 4-6. These materials will be multidisciplinary and will be built around five areas of environmental concern; air, water, land, population, and sights and sounds. Each of these five areas will be viewed from three aspects; natural, man-made, and man-affected; or the way the environment once was, the way it is now, and the way it can be again. The objectives of the units are not only to create an awareness of, but to also develop positive attitudes toward the environment.

North Carolina

John Ellington

The 1969 General Assembly enacted the Environment and Natural Resources Act directing the State Board of Education to " . . . study the need for and to formulate proposals relating to the introduction into the curriculum in the Public School System of North Carolina of a study of Environment and Natural Resources . . . ." The Act further directed that the study include an examination of: the status of the existing curriculum, available textbooks, current instruction in other states, available curriculum guides and instructional materials, and the need for in-service education for teachers. Public hearings were also to be conducted in order to insure the widest possible public participation in the establishment of any new directions in education.

The State Board of Education directed the State Department of Public Instruction to establish a Task Force, composed of forty-two members from government, industry, public education, and the general public, to carry out the study.

The Task Force was organized into four working committees: The Working Committee on Teacher Education, The Working Committee on Efforts of Other Agencies, The Working Committee on Position Papers, and The Working Committee on Curriculum.

The chairman of each committee was also a member of the Steering Committee of the Task Force. The Steering Committee conducted a total of six public hearings across the state during January of 1970. These hearings were held in Charlotte, Asheville, Wilmington, Greenville, Winston-Salem and Raleigh.

The various working committees conducted activities relevant to the task each was assigned. These were conducted during the spring and summer of 1970 and reports were submitted to the Chairman. The conclusions and recommendations are published in A Report to the North Carolina General Assembly: Environmental Education.

The Task Force on Environment and Natural Resources in cooperation with the North Carolina Department of Public Instruction has prepared a Teacher's Guide for Environmental Education.

The Division of Science Education of the Department of Public Instruction has published Environmental Education: Concepts, Activities, Bibliography (March 1971).

Further information on North Carolina's activities will be found in the above reports.

North Carolina now has a large number of schools that are offering or are planning to offer environmental oriented courses. Most of these are offered as part of the science or social studies curriculum. In social studies in particular we have a number of schools moving to mini-courses (9 weeks) and courses dealing with environmental questions are showing

up quite frequently in this structure. In one or two cases there is interest in a science/social studies team teaching situation.

Conclusions

The conclusions of each committee were as follows:

I. The Working Committee on Teacher Education

A. There is an apparent weakness in the present teacher education program in the state. Specifically, there is a lack of instruction relating to environmental concepts in pre-service preparation of professional teachers.

B. There is an apparent weakness by many professional teachers in the understanding of environmental concepts. There appears to be a limited opportunity for these teachers to gain needed concepts and information about their environment.

C. Present teacher certification requirements fail to stress the importance of the environment and natural resources in the professional preparation of teachers.

II. The Working Committee on Efforts of Other Agencies

A. There is, at present, an information explosion of environmental education materials.

B. There are many agencies, both public and private, which have been established to develop and provide inexpensive environmental education materials. However, information about these materials is not readily available to public school educators. There is a need for a "clearing house" of environmental education information.

C. There is, at present, an increasing number of publications reflecting the public's concern for the quality of the environment. Some of the publications are accurate and responsible. Others are of questionable value in the school curriculum.

D. There are a few programs sponsored by business and industry offering specialized training for public school teachers. However, most of these programs are too specialized for the generalist in the teaching profession.

E. There are apparently no programs that could be universally transferred directly into the public school curriculum for environment and natural resources.

III. The Working Committee on Position Papers

A. There is indeed a pending environmental crisis present in the state of North Carolina.

B. There is a demonstrated need for more information about this crisis to be distributed to the general public via the public school system.

C. Specifically, environmental education should include the following topics: ecology, organism-environment interaction, variation in environmental factors, population biology, the gross biology of ecosystems, natural resources, pollution, and environmental decision-making.

D. Major concepts in environmental education should be identified.

E. Society is now developing a new awareness of environmental contamination and degradation and will soon demand more environmental information.

IV. The Working Committee on Curriculum

A. There are very few textbooks, grades K-12, utilized in the public schools of North Carolina that have a significant amount of information about the environment and natural resources.

B. Other state education agencies have not produced a significant amount of information about the environment and natural resources. Several states do appear to show an interest in the area and are now actively developing and evaluating new environmental programs which may be implemented in these states. The work is incomplete at this time.

C. There has been a vast amount of curriculum materials produced by both public and private agencies. However, much of this material is inappropriate for the needs of North Carolina. There is a recognized need for the establishment of some agency responsible for the development and evaluation of implementing programs for North Carolina.

D. The four major areas of environmental education suggested by the Working Committee on Position Papers should contribute to an outline for an environmental education program.

E. There are a number of concepts that could be included under the suggested areas: ecology, natural resources, pollution, and environmental decision-making.

South Carolina — John Jackson

The People and Their Environment Series (Ferguson Publishing, Chicago, Illinois) was written by a team of South Carolina teachers. Handbooks for the Series have been distributed to all first through sixth grade classrooms and all science and social studies teachers. The South Carolina State Department of Education is now undertaking a program to encourage use of the Series.

Several South Carolina school districts are presently applying for Title III monies to create environmental education centers for exceptional children.

The proposed centers will:

1. Involve the children in living and working together.

2. Incorporate an interdisciplinary approach to studying the environment.

3. Serve as teacher training sites.

4. Investigate immediate environmental problems and solutions at the site.

5. Involve the Corps of Engineers in the projects.

The U. S. Forest Service is also recognizing the educational potential of its lands. A 2500 acre site near Columbia, South Carolina, is presently being prepared. It will serve approximately 300,000 people in the immediate area as well as from other parts of the state.

The following components are being planned:

1. A residence center for 900 people.

2. Architectural design to accommodate handicapped persons.

3. Will provide educational programs in ecology, history of settlement, history or agriculture, etc.

The proposed objectives for environmental education in South Carolina on a state wide basis are:

1. A state plan for environmental education and the support to institute it.

2. The integration of environmental education in grades K-12 as an interdisciplinary study.

3. To establish outdoor laboratories for day and residence use in the mountains, on the piedmont, and beside the Atlantic Ocean.

Summary of South Carolina Environmental Education Activities:

1. South Carolina has a citizens advisory council for Conservation Education. It was founded in 1960. F. E. DuBose, Superintendent, Clarendon County District #3, Turbeville, South Carolina, is president.

2. Curriculum guides, "People and Their Environment-Teachers' Curriculum Guides to Conservation Education," Grades 1-2-3; 4-5-6: Social Studies 10-11-12; Science 7-8-9; Biology; Home Economics 9-12; and Outdoor Laboratory 1-12 have been written and distributed to all school districts. These guides are now available from the J. G. Ferguson Publishing Company, 6 North Michigan Avenue, Chicago, Illinois 60602.

3. The State has a full time Conservation Consultant.

4. Numerous workshops have been held in local school districts across the state.

5. Some school districts are developing outdoor laboratories.

6. Two National Park Service Environmental Study sites are available for use in the state.

7. The U.S. Forest Service has plans for a resident center to help train teachers in the fundamentals of Environmental Education in the central part of the state.

8. Five ITV programs showing Environmental Education lessons have been produced.

9. Two ITV programs showing what teachers are actually doing in Environmental education activities have been produced.

10. A state conference has been held to discuss teacher training in Environmental Education methods as part of the normal undergraduate training of all teachers.

11. Clemson University hopes to construct an Environmental Education training facility.

12. One school district is conducting a resident Environmental Education program.

Examples of Environmental Education Teacher's Guides Available On A Short Term Loan From The Conservation Consultant's Office, State Department of Education

South olina — John Y. Jackson

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AN INTRINSIC EVALUATION OF THE SOUTHEASTERN CONFERENCE ON THE SOCIAL SCIENCES AND ENVIRONMENTAL EDUCATION

-- A. Guy Larkins

Introduction

Hundreds of man hours went into this conference. The general evaluation problem was that we didn't know whether the purposes for holding it were met.

Those who produced the conference intended to increase the amount and quality of environmental education in the Southeastern United States. Under ideal cirsumstances, an evaluation of the conference would have directly assessed whether that intention was achieved.[1] Direct assessment of intended purposes is referred to as payoff evaluation.

Scarce time, the limits of which were set by pre-established deadlines for separate oral and written versions of this report, precluded payoff assessment and influenced the decision to conduct an intrinsic or indirect evaluation.

One question guided our intrinsic assessment more than any other. It was simply, "How are the participants reacting to the conference?" We assumed a positive relation between audience enthusiasm and subsequent improvement of environmental education in the target states. This assumption was treated as a justification for our observations, not as an hypothesis to be tested.

Time limits also influenced the decision to use participant observation rather than traditional hardnosed paper and pencil tests as the primary observation instrument, and to forego a tight causal evaluation design.[2]

Compared to traditional evaluation methods, then, this work is impressionistic. The procedures used, however, have inherent strengths as well as weaknesses.[3] An attempt was made to reduce some of the weaknesses by following Smith's[4] advice to use a variety of measures as a system of cross-checks on the validity of the data. The cross-checks included multi-observers, multi-instruments, observations made at more than one time, in more than one setting, and of a variety of persons.

Observed signs of audience reaction to the conference were: applause, posture and facial expressions, note taking, questions put by participants to the speakers, content of informal bull sessions such as coffee breaks, answers to explicit questions which we asked during informal interviews, and attendance. Early on the morning of the conference, we decided to add a brief, open-ended questionnaire. Although constructed in haste, this instrument provided invaluable data to the assessment. Responses could be grouped and tabulated, adding to the specificity of our conclusions. On the other hand, field notes from the participant observations, added context to the questionnaire data and allowed us to make better explanatory guesses about audience responses.

Judgments were made about audience reaction to the conference in general, and for specific sessions and groupings of sessions.

Results and Discussion

General Reaction. In general, the conference generated neither marked enthusiasm nor marked rejection by the audience. For instance, we watched for three signs of enthusiasm in applause: spontaneity, vigor, and duration. By these standards, the only ovation went to the chef for preparing a particularly tasty banquet. No other applause was even close. At times the audience appeared to be caught off guard when a speaker finished his presentation, for there was no applause. For the most part, however, applause was polite and mild enthusiasm was sometimes evident.

The vigorous arm waving, competition for the chance to ask a question, and extended questioning periods which can be marks of a turned on audience never occurred in this conference. After each of several presentations, participants were invited to ask questions of the speakers. Generally, the invitation was met with silence. Most exceptions seemed to be planted questions asked by faculty of the University of Georgia Department of Social Science Education. However, lack of questions may have been due more to sessions running over time than to lack of audience interests. Responses to the questionnaire frequently mentioned the need for more question and answer periods.

Posture and facial expression sometimes signify attention and/or enthusiasm. The field notes indicate occasional signs of definite widespread audience interest as well as signs of definite widespread boredom. But posture and facial expression most frequently communicated an almost inscrutable blankness which may have been the result of polite inattention. During these periods of apparent inattention, large proportions of the audience failed to respond to jokes which the observer found either genuinely humorous or notably ironic.

Audience note-taking was one of the more valuable cross-checks on the observer's impression that the audience was inattentative. During parts of several apparently boring presentations, the author was surprised to find 1/4 to 1/3 of the audience taking notes. The numerous signs of audience inattention recorded in the field notes are also balanced by the fact that few if any participants avoided inconveniently early or late sessions or left when sessions did not meet their expectations. The constancy of attendance was a pleasant surprise which ran counter to our experience at conventions of social studies educators. Perhaps the majority of participants found the proceedings worthwhile even when some presentations were dragging.*

The most striking indicators that audience reactions were positive as well as negative were responses to informal (and hopefully unobstrusive) interviews. During lulls between formal sessions, the author chatted with a number of participants to elicit comments about the conference. Some interviewers were negative towards previous sessions. On the other hand, at least some positive impressions were reported by nearly everyone who was interviewed. And a few offered only positive comments despite encouragement by the interviewer to be negative. It appeared to the author that most of those who voiced negative judgments believed that the conference was worthwhile.

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*Attendance fluctuations appeared to be due almost entirely to "drop-in" such as university methods courses which were assigned to attend specific sessions. We looked for signs that conference participants were playing hooky--staying in the lounge to read or congregating in the coffee shop--but found none.

Although the conference generally produced neither marked enthusiasm nor marked rejection, positive reactions outnumbered negative comments. Responses to the written questionnarie support this claim. Of three items, the first asked, ". . .which sessions. . .were most useful to you?" The third asked, "Which parts of the conference were least successful?" And the second asked whether the conference provided the participant with either expected or unexpected dividends. The second question seemed to elicit general or overall judgments, which were frequently supported by responses to the other two items. Of 35 responses, 2 were strongly negative and 9 were mildly negative of the conference in general. On the other hand, 18 respondents were slightly more positive than negative and 6 were strongly positive *

The following response was one of two rated strongly negative:

> There was very little passion about an issue which is debated quite passionately. Passion in and of itself is of little value; in this conference, though, there was neither passion nor the kind of thoughtful analysis which could provide a basis for curriculum development and implementation.

This response was one of six rated strongly positive:

> I came with a rather negative set of expectations--since so many environmental education conferences end up with the same representatives "talking to each other again." This conference was different and <u>did</u> provide me with unexpected dividends and with a brighter outlook for possible action.

The mixed reaction of the majority of conferees, and their tendency to be neither strongly positive nor negative, is illustrated in the following quotation. It is typical in that nearly every participant was able to give both positive and negative criticism.

> The informal sessions were most successful. The free exchange of ideas on a one-to-one basis helped me most. The general session on Monday morning ("Implementing Curriculum Changes") was very helpful also in enabling us to hear of other individuals' efforts and successes. But, the general session on April 4th (Interdisciplinary Dialogue) was a rehash of old "stuff" we could see on T.V. almost every evening, or by watching "white paper" T.V. specials, or better yet, by reading newspapers.

<u>Reaction to subparts of the Conference</u>. Audience reaction was more postive towards some sessions than others. The expectation that this would occur influenced the construction of the questionnaire--items #1 and #3

*The reported ratings of questionnaire responses were made by the author of this paper. Independent ratings by two other persons produced the following frequencies in each of the four categories: 1) 4 strong positive, 18 mild positive, 11 mild negative, 2 strong negative; 2) 8 strong positive, 13 mild positive, 9 mild negative, 5 strong negative. The first set of independent ratings is almost identical to that produced by the author. Both support the claim that the responses were generally more positive than negative.

asked which parts of the conference were the most and the least successful. And, of course, including those items on the questionnaire influenced the type of responses obtained. However, data from the field notes support responses to the questionnaire which indicate that audience reaction differed from speaker to speaker and sometimes from one part of a presentation to another.

That audience reaction was not uniform to all parts of the program is not astounding. But the contradictory ratings given to some sessions are puzzling, to say the least, at first glance. For instance, 15 participants said that the interdisciplinary panel was one of the most successful parts of the conference. In contrast, 13 participants said it was one of the least successful. Furthermore, the panel received nearly twice as many negative comments as its nearest competitor in unpopularity.

The following summarizes the frequency with which sessions were mentioned as most or least successful.

Best sessions:

1.	Interdisciplinary panel	15
2.	Informal discussions	14*
3.	Activities and demonstrations	11
4.	Curriculum applications	9
5.	Implementing curriculum change	6
6.	State group meetings	6
7.	Keynote speech	2

Worst sessions:**

1.	Interdisciplinary panel	13
2.	Federal legislation	7
3.	Water Lab	4
4.	Keynote speech	3
5.	Activities and demonstrations	1
6.	Curriculum applications	1
7.	Implementing curriculum change	1

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*This figure is a total of all responses which indicated either that the informal sessions were the most successful or that failure to have more informal sessions was a weakness of the conference. Participants who gave both types of response were counted only once.

**Most of the positive comments were directed at specific sessions. Negative comments, however, were frequently aimed at the conference in general. Examples: Speakers were too conservative. Content was too elementary--underestimated sophistication of audience. Tone of the conference was too negative. Too much emphasis on outdoor education. Need for more diversity of opinion, more small group interaction, and larger materials display. Most of these criticisms occurred only once.

At least one conclusion is certain: The interdisciplinary panel impressed the audience. Only 7 of 35 respondents failed to mention it as either one of the best or worst parts of the conference. Comments about the panel are fascinatingly contradictory. Some examples:

1. The Sunday evening session was devastating!
2. I feel that this session served as an excellent means of focusing on the problem.
3. Sunday night general session was a complete failure.
4. The . . .session was very stimulating for me.
5. The panel of experts was a failure. Statements stood unchallenged which were a wet blanket on the conference.
6. The Sunday Evening session was very successful and information received. . . was very vital. . .
7. The speakers were dull and appeared to have limited knowledge. Where did you get that . . .? Panel discussions are dull unless the participants are particularly dynamic. Those guys ain't.
8. The best session was the interdisciplinary dialogue. The panel showed very well how diverse our knowledge is and the lack of true "hard data" upon which we can form our actions.

One possible explanation for the marked disagreement about the worth of the panel of experts is that the presentations were both very good and very bad. Apparently, some speakers made a better impression than others. Several respondents specifically qualified their favorable judgments of the panel either by singling out certain members, or by limiting praise to their presentations. Similarly, several respondents qualified their negative judgments by specifically criticizing other members of the panel. It is likely that respondents would probably favor the discussion among panelists over the formal presentations which opened the session. This latter judgment is based on the participants expressed preference for informal sessions.*

Even if the above explanation is valid for some of the apparently contradictory judgments about the interdisciplinary panel, it is probably not adequate for all of them. When one person says that the panel was a complete failure and another says it was very successful, very vital, and enlightening, their differences are probably more than superficial.

The author had three preconceived possible explanations for differing reactions to subparts of the conference. The first was that differences in the backgrounds, needs, and expectations of members of the audience would produce differing judgments about the various sessions. The second was that some speakers would be more polished than others--that audience reaction could be explained in terms of the mechanics of public speaking or what might be roughly called the quality of the presentation. The third was that there

*See item #2 under Best Sessions, p. 7 of this report.

would be a general bias towards educational practice and away from theory or information about environmental problems per se.

That different members of the audience would have different backgrounds, needs, and expectations is a common place, but apparently one which is easy to forget or to ignore. The author, for instance, was brought up short by the narrowness of his perception of what different individuals might expect of this conference. The field notes on informal interviews record a striking range of expectations.

Given the intended diversity in the conference audience, genuine differences over which parts of the program were most worthwhile are to be expected. In the future, a preconference sampling of the background and expectations of anticipated participants might be used to more nearly match the content of programs to the needs and desires of the target groups.

The second preconceived hunch about differing reactions to subparts of the conference--that they were due to more skillful presentations by some speakers--found little support in the field notes. For instance, Congressman Blackburn gave a polished performance which utilized many of the elements of structure, pacing, and delivery considered essential to good public speaking. Significantly, no one rated Blackburn's speech as one of the best presentations. Apparently, the audience responded more to content than form. Unfortunately, while responding to content, they may have looked with favor only on those speakers who told them what they wanted to hear.

The third preconceived explanation for differing reactions to subparts of the conference--that the audience in general would prefer information about educational practice over theory--found considerable support in both the field notes and the responses to the questionnaire. There were exceptions, of course, which are probably explainable in terms of the previously discussed difference in frames of reference of the participants.

The following excerpts from the field notes for the second general session--"Implementing Curriculum Changes"--indicate audience reaction as speakers switched from talking about theory or general background information to talking about educational practice.

> When the speaker mentioned that environment curriculum called NEED would be published through Silver Burdett, at least 15 heads went down and notes were taken.
>
> A good deal of note taking. It causes a visible rustle that was not present yesterday.
>
> This speaker is hardly dynamic, but he is speaking to specific practical points about curriculum and I swear that the audience is more actively following his speech than yesterday.
>
> At least 22 note takers now.
>
> Finding: Audience is interested in recording information which they perceive as having a direct bearing on teaching.
>
> Yesterday I was trying to interpret the failure of the speakers in terms of the dynamics or techniques of public speaking. The guys today are no more dynamic, but their message is different.

Preference for practical teaching suggestions may have been one of the reasons the audience responded favorably to Dr. Odum. The field notes record the impression that his presentation was a folksy, down to earth, "talk for teachers." Field notes also record the impression that all of the panelists gave sloppy, off-the-top of the head, speeches. Two possible explanations for the audience preferring some speakers over others despite lack of apparent differences in the quality of the presentations are: 1) the greater inclination for some speakers to engage in controversy, and 2) the tendency for some speakers to speak more to the interests of teachers than to the interest of academicians.

Responses to the questionnaire also provided fairly strong indications that the audience preferred presentations that dealt with school applications rather than with information from the social science disciplines or general background information on ecology. Of 33 respondents who made negative comments about the conference, only 2 were critical of those sessions which dealt with teaching practice.

An unanticipated explanation of the general preference for some sessions over others has to do with the informality of the presentation. As noted earlier, 14 participants opted for small groups which allowed for comparatively unstructured discussion. The following two comments are typical:

1. The informal sessions were most successful. The free exchange of ideas on a one-to-one basis helped me most.
2. The conference was too structured. There was no time for personal assimilation of what had been said. There were not enough "rapping" sessions.

Conclusion

The field notes and responses to the questionnaire contain far more insights than could be included in this report. For instance, a good argument could be made that the field trip to the water lab was the least successful part of the conference, despite the greater frequency of negative comments about the interdisciplinary dialogue.

This report has focused on the reaction of the participants to the conference in general, and reactions to some of the more significant subparts of the conference. It was concluded that the general reaction was mixed--neither overwhelmingly favorable nor negative. And that some subparts created far more interest, and occasionally far more favorable response, than others.

Postscript

One bit of information has been deliberately saved for last. Although the questionnaire was not designed to elicit comments about the efficiency with which the conference was organized and managed, a number of participants volunteered comments such as: "Overall the conference has been very well planned, and the sessions helpful."

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David A. Pierfy

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Reflections

Jane Garrett

It seemed that.....

the ecologist built a house
the economist asked, "how much is its cost?"
the geographer inquired, "where is it?"
the political scientist questioned the zoning
the sociologist acknowledged man as the occupant.

Closet doors were cracked open....
Skeletons seen.....
A colorful chart showed historic evolution.

But no archeologist was present.....
Add no one examined the bones.

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The Sierra Club, Chattahoochee Chapter

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